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GREEN SCHOOL SERIES

A Guide to Green Material

Experiences and Learnings in Developing Effective Environmental Education Material

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CEE

Centre for Environment Education, Ahmedabad

A Publication supported by Ministry of Human Resource Development, Government of India

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A Publication supported by Ministry of Human Resource Development, Government of India

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Centre for Environment Education (CEE) is a national institution established in 1984 and supported by the Ministry of Environment and Forests, Government of India as a Centre of Excellence in Environmental Education. The main objective of CEE is to create environmental awareness among children, youth and the general community. To achieve this, CEE develops innovative programmes and material, and field tests them for their validity and effectiveness.

Preface

In a country like India, which is so diverse in terms of biogeography, socio-economic conditions, cultures and traditions, etc., it is neither possible nor desirable to develop environmental education material centrally. In some ways, any attempt at developing uniform educational programmes and material for a country so diverse is bound to run into difficulties. While something might work in one region in one set of circumstances, it would be inapplicable in another.

On the other hand, an attempt at developing material for the different situations in Indian schools would mean that any agency would be able to design for only a few such situations.There are about 5,63,000 primary schools with more than 9,57,40,000 students and over 1,44,145 middle schools with about 3,09,40,000 students in India. These schools range from urban schools with modern facilities, to single-teacher rural schools where children in four grades share a classroom. Across the country, instruction is in over 20 languages.

Moreover, our school system is unfortunately entrenched in the lecture methodology and even within that, in getting students to reproduce what is in the textbook. This is usually done without questioning and often without any relationship to observation of the real life situation. Not only are the opportunities for learning which exist in the environment not utilized, but often they are positively discouraged.

For instance, a child in a school near Ahmedabad, when asked by his teacher what birds eat, brought wrath upon his head by answering 'cows'. What no one stopped to ask was why the child gave this response. It was during a later conversation that it was discovered that the answer was reflective of the reality the child was seeing on his way to school. The child used to see vultures and kites feeding on carcasses everyday, and therefore the answer. This experience must have led, at least in the case of this child, to complete confusion, where reality was negated in favour of a textbook answer.

Introducing environment as one more subject in such a teaching atmosphere is only paying lip service to this subject. To teach environment one has to change the very approach to teaching and learning, and not merely change the content, while retaining existing teaching methodologies.

CEE has felt, from the start, that a different concept of design needed to be explored for this.

Our educational designing has attempted to be somewhat like the saree–more a tool than a finished product; a tool that comes alive in the hands of each teacher, its application being the combined effort of the designer and the user.

One of the ways this can be done is by preparation of flexible material, material that can be easily adapted to local environmental conditions, material that through teacher-training workshops can be supplemented with local examples, and material which discusses one local example as a case study to be used to generate discussion on other local examples.

How does one translate this concept into educational media? We were working on designing an educational activity around a pond. A chart with an illustration of a pond is used with this activity. An attempt at preparing a ready chart however, had problems. It looked like one pond but not at all like the next one. One approach could be to make sheets with illustrations of individual elements like insects, birds, shrubs, people, cattle etc. The making of the chart using these elements, and adding to them where necessary, would become a classroom activity. The chart made in the classroom would not only look more like their own pond, but the preparation of it would itself be an effective observation and learning activity.

Whatever the methodologies and approaches, the key to the whole educational system is the teacher and it is only through the initiative and innovativeness of the teacher that change can be brought about in the classroom. We realize that the challenge is about empowering teachers with ideas, but not prescriptions, of what to do and not to do. Teachers need to know about and be able to select from a wide variety of methodologies, the best one suited to their environment.

This book describes some of CEE's experiences in developing environmental education material towards meeting this challenge, keeping CEE's basic philosophy and concept of design in view. The learnings from these experiences will, we hope, be of use to all those involved in developing environmental education material for students and teachers.

Kartikeya V. Sarabhai
Director
Centre for Environment Education

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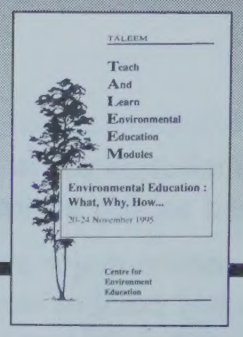
Environmental Education
An Overview



Education is the game of trying to work out how the world works... the game of getting the feeling of cause and effect, of one thing leading to another. Education has a crucial role to play in society. It is this process that disseminates knowledge, imparts necessary skills, and helps in forming or changing attitudes. One of the most basic areas about which to get educated is an understanding of how the systems of life function and how we humans fit into them. This is what constitutes environment. However, because this aspect is multifaceted, and touches upon every aspect of life, most people take it for granted.

The 1970s saw a growing concern about the deteriorating state of the environment, and the need to do something about conservation and improvement of the situation. The concept of an environmentally oriented education system which would help to prepare environmentally conscious citizens also emerged in response to this. Thus grew the idea of Environmental Education (EE)—not as a new discipline, but rather as a new dimension in the educational system.

The Stockholm Conference

The same concerns and possible responses were emphasized at the United Nations Conference on the Human Environment which was held in Stockholm from 5 to 16 June, 1972. Representatives from 113 countries attended the Conference. For the first time, such an assembly focussed on the need to work out a practical plan of action for the benefit of all mankind.

The Conference resulted in the Declaration of the United Nations Conference on the Human Environment. The Declaration stated that "to defend and improve the environment for present and future generations has become an imperative goal for mankind."

To meet this goal, 12 principles were formulated and new strategies were formed to be incorporated into developmental activities. These emphasized that education, utilizing the findings of science and technology, should play a leading role in creating awareness and a better understanding of environmental problems.

The concept of environmental education emerged from this Conference. The recommendations emphasized the need for environmental education, recognizing that this would help every individual to acquire the essential knowledge and skills, and develop proper attitudes and commitment to improve environmental quality.

The Stockholm Conference also initiated the idea of observing World Environment Day on 5 June every year. This was meant to be an occasion to create environmental awareness through the organization of numerous events and activities concerning the environment.

The Conference also resulted in the setting up of the United Nations Environment Programme (UNEP) with its headquarters at Nairobi.

The Belgrade Charter

In response to one of the recommendations of the Stockholm Conference, UNESCO and UNEP launched an International Environmental Education Programme (IEEP) in 1975. This aimed at promoting exchange of information and experiences, research and experimentation, training, curricula and material development, and international cooperation in the field of EE. As part of the activities of IEEP, an international workshop on environmental education was held at Belgrade in 1975.

The Belgrade Charter proposed a number of guiding principles for environmental education programmes. The Charter stressed that environmental education should:

- be a continuous lifelong process
- be interdisciplinary in approach
- consider the environment in its totality

- emphasize active participation in preventing and solving environmental problems
- examine major environmental issues from a world point of view giving due importance to regional differences
- promote the value of local, national and international cooperation in the solution of environmental problems.

In the following two years, several expert meetings on environmental education were held in different parts of the world.

The Tbilisi Conference

In 1977, the first Intergovernmental Conference on Environmental Education was held at Tbilisi, USSR. It brought together representatives from government as well as non-governmental agencies to discuss and recommend appropriate measures to promote EE at all levels.

The Tbilisi Conference reinforced the major goals of environmental education which were to develop awareness and concern among the world population about the ecological, economic, political and social interaction and interdependence in the environment and their problems.

The Declaration of the Conference stated that:

Environmental education, properly understood, should constitute a comprehensive lifelong education, one responsive to changes in a rapidly changing world.

It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values.

By adopting a holistic approach, rooted in a broad interdisciplinary base, it recreates an overall perspective which acknowledges the fact that natural environment and built environments are profoundly interdependent.

It helps reveal the enduring continuity which links the acts of today to the consequences for tomorrow. It demonstrates the interdependencies among national communities and the need for solidarity among all people.

The Tbilisi Declaration laid down a clear statement of the goals and objectives of EE.

Goal Statement of Environmental Education

To develop a citizenry that is aware of, and concerned about, the total environment, and its associated problems, and which has the knowledge, attitudes, motivations, commitment, and skills to work individually and collectively toward solutions of current problems and the prevention of new ones.

Environmental Education thus aims to assist individuals and groups to:

- Obtain an understanding that people are an inseparable part of an environmental system and that whatever they do alters their surroundings in both harmful and beneficial ways;
- Obtain a basic knowledge of how environmental problems can be solved, and recognize the responsibility of individuals and each segment of society to cooperate in their solution;
- Develop analytical thinking and action skills for understanding, preventing, and helping to correct environmental abuses.

The Objectives of Environmental Education:

- Awareness—to help individuals and social groups acquire an awareness of and sensitivity to the total environment and its allied problems;
- Knowledge—to help individuals and social groups gain a variety of experiences with the total environment and to acquire a basic understanding of the total environment, its associated problems and humanity's critical responsible presence and role in it;
- Attitudes—to help individuals and social groups acquire social values, strong feelings of concern for the environment and the motivation for actively participating in its protection and improvement;

- Skills—to help individuals and social groups acquire the skills for working toward the solution of environmental problems and to foster a dialogue between these groups; and
- Participation—to help individuals and social groups develop a sense of responsibility and urgency regarding environmental problems, to ensure appropriate action to help solve these problems and avoid future problems.

Photo: Janki Shah

Guiding Principles of Environmental Education which would help EE curriculum developers to achieve these objectives:

- Consider the environment in its *totality* natural and built, technological and social, economic, political, moral, cultural and historical, and all other aspects;
- Be a continuous *life-long process* it should begin at the preschool level and continue through all formal and non-formal stages;
- Be *interdisciplinary* in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;
- Emphasize *active participation* in preventing environmental problems and working toward their solution;
- Examine major environmental issues from *local, national, regional* and *international* points of views, so that learners receive insights into environmental conditions in other geographical areas and into the interrelatedness of all concerns;
- Focus on *current* and *potential* environmental situations while taking into account the historical perspective;
- Emphasize the *complexity* of environmental problems and thus the need to develop critical thinking and problem-solving skills;
- Utilize diverse *learning environments* and a broad array of educational approaches to teaching and learning about and from the environment with due stress on practical activities and first-hand experiences;
- Focus on the learner's *own community* and relate topics being discussed to state, regional, national and international issues and perspectives;
- Relate *environmental sensitivity, knowledge,* and *problem-solving* at every level, but with special emphasis on environmental sensitivity to the learner's own community in early years;
- Enable *learners to play a role* in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;

- Promote the value and necessity of local, national and international *co-operation* in the prevention and solution of environmental problems;
- Explicitly *consider environmental aspects in plans* for development and growth.

Photo: P.J. Joseph

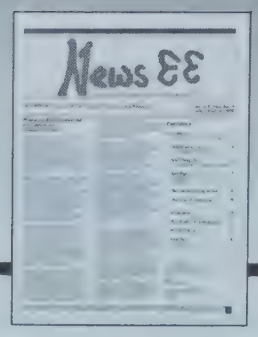
In formal education, at all levels, account should be taken of all the ingredients of the education process (programmes and curricula, books and textbooks, teaching aids and resources, methods, etc.) and interdisciplinarity gradually achieved. Some ways by which this could be achieved are to introduce into each subject the essential environmental dimension; to have curricula prepared by interdisciplinary teams; to study practical problems, that is, the reality surrounding pupils and teachers.

In summary, it could be said that environmental education should be an integral part of a nation's educational process. It should be centered on practical environmental problems and be of an interdisciplinary character. Environmental education should aim at building up a sense of values in people, contribute to the public well-being, and concern itself with the survival of the human species. Its focus should reside mainly in the initiative of the learners and their involvement in action and it should be guided by both immediate and future subjects of concern on the local, national and global level.

India's National Policy on Education, 1986, states "There is a paramount need to create a consciousness of the environment. It must permeate all ages and all sections of society, beginning with the child. Environmental consciousness should inform teaching in schools and in colleges. This aspect will be integrated in the entire educational process."

The Policy visualizes a national curricular framework which has a common core and includes several elements having a direct bearing on the natural and social environment of the pupils. These core areas are expected to occupy a place of prominence not only in the instructional materials but also in the classroom and out-of-school activities.

A Strategy for Environmental Education



"Environmental education should simultaneously attempt to create awareness, transmit information, teach knowledge, develop habits and skills, promote values, provide criteria and standards, and present guidelines to problem solving and decision making. It therefore aims at both cognitive and affective behaviour modification. This is an action oriented, project centred and participatory process leading to self-confidence, positive attitudes and personal commitment to environmental protection. Furthermore the process should be implemented through an interdisciplinary process." (UNESCO-UNEP Congress on EE and Training, 1987).

This definition stresses that Environmental Education (EE), is a comprehensive, continuing process; rooted in a broad interdisciplinary base, but responsive to changes in a rapidly changing world; linking the acts of today with consequences for tomorrow, while emphasizing enduring continuity.

All sections of society are involved, directly or indirectly, in making environmental decisions. Thus target audience for EE would necessarily encompass all ages and all levels of education and society. Any strategy for EE must necessarily be multi-pronged—reaching out simultaneously to the different target groups through different methods, approaches and media. Thus, a strategy for EE has to be integrative, problem-oriented, practical, continuous and diversified.

EE in Schools

It is accepted that EE should be a lifelong process beginning at the pre-school level and continuing through all formal and non-formal stages. If this process is to be truly meaningful, it is best to start early. Thus children become the first and most important target group, and a strategy of EE which addresses itself to this group becomes imperative in the overall scheme of things.

The framework: Environmental Education is not just a subject to tell children about. It is an opportunity to let children use their own environment, of which the school is a part, as a source of information, a ground for learning, and a storehouse of experience which will last a lifetime.

Thus environmental education, to be effective, should ideally utilize diverse learning situations and a broad array of approaches to teaching and

Photo: Gopalkumar Jain

learning about and from the environment, with due stress on practical activities and first-hand experience.

The institutional framework into which this can be introduced is the school which itself, in space and organization, forms a special environment which can be effectively used for environmental education.

EE which is initiated within and which makes use of the school environment should be a continuous process. The school should provide the learning experiences which, in one way or another, involve children in observation and problem solving exercises. The immediate environment of the school may be able to provide a range of learning experiences. This should be combined with provision of opportunities for pupils to observe and explore, and seek their own answers.

The school system as it exists today seems to end up thwarting these very attributes. The emphasis on quantity rather than quality has led to heavier loads in school bags and on teachers' time, and greater dependence on drab textbooks and rote learning. Memory, rather than attitudes and skills, are polished.

Ideally the school should provide learning experiences which in one way or another awaken interest, provide information, teach problem-solving skills and involve students in action. Direct participation and a sense of fun are also preconditions to effective learning.

The main actors that interact within the framework are students, teachers, and the curriculum or instructional material and methods. Programmes and material that endeavour to address all these become essential to the realization of the goals of environmental education.

Students: Children are at school during their most formative years. Even if a large proportion of them drop out of school after the initial stages, the impact of school during the early years is tremendous and long-lasting.

It is during this period that children develop fundamental skills in reading, writing and calculating. They also begin to develop concepts necessary for everyday living, as well as habits, attitudes, and values.

Children do not generally come into the school system with predetermined attitudes, values and opinions, but rather with an inquisitiveness to learn. Hence they are receptive to information and new ideas.

The continual interaction of the child with the environment, the natural characteristics of children, and their natural ability to make some sense of the many impressions that crowd their mind, could be the starting point of EE. The objectives of EE then would be to involve the student in natural processes so that they understand their part in, and dependence on, them; to create awareness of social processes that affect the environmental ethic, and to activate their concern, ultimately leading to some action. The impact of this education may not be immediate or obvious but a firm foundation will certainly be laid at this stage. What students learn at school and how they learn it thus become very important issues for consideration.

Teachers: Within the school system it is the teachers who play the greatest role in ordering learning conditions and guiding or inspiring students' thinking and action in a desired direction.

Teachers bear a great responsibility. They can be communicators of knowledge as well as architects of attitudes. A teacher cannot learn for the student, but a teacher can inspire a student to want to learn, and may guide the student in experiences from which he or she can learn some fact, attitude, or skill. For the teacher, environmental education cannot consist of merely passing out facts and rules to be memorised by the students. Teachers would need to create a suitable climate for teaching and learning about the environment. They would need appropriate curricula, and material for best communicating ideas. Above all the teacher would also need to adopt innovative methodologies and approaches to this process.

In the existing educational system teachers are beset by a number of problems and constraints—ranging from management problems to lack of resources, whether physical or academic.

While the content for teaching is provided in the form of text books, the methodology, skills and additional reference or support material for the effective use of the instructional material are often not provided. Moreover, most teachers have neither the time, resources nor confidence to undertake the task of active teaching-learning which is the key to effective EE.

A teacher's role in environmental education should be to assist learners in acquiring positive environmental attitudes towards the total environment, in recognizing, analyzing and clarifying personal values concerning the environment, and developing skills to solve problems in order to live more harmoniously with the environment.

Teachers within and outside the formal school system (parents and instructors in non-formal education), need a great deal of support and encouragement if teaching is to move away from a dull repetition of facts, towards an approach which encourages thinking, problem solving and active participation of teachers and learners alike.

This support would need a two-fold approach—the development of instructional and resource material, and methods that combine worthwhile content with an enjoyable process; and the orientation and training of teachers in the optimum use of the same.

Need for instructional resource material: Within the institutional framework of the school, a continuous interaction takes place between students, teachers, and instructional material. If any meaningful teaching-learning has to occur, this interaction has to be optimized.

The school system and curriculum as they operate today leave the teacher with almost no time or resources to make this experience a mutually enriching and meaningful one. Even the best intentioned teachers find themselves constrained by the poor quality of text books, non-availability of additional teaching aids and resources, and lack of reliable data on national and local situations and issues. Even with access to libraries and resource material, the teacher finds little help as most of the examples, themes and issues are related to countries other than India.

If teachers are to function as effective agents of EE, it is necessary that they have access to a sufficient and continuous supply of reliable instructional, supplementary, resource and enrichment material. The development and dissemination of such material becomes an important component in the framework of a comprehensive strategy for EE.

Nature of instructional resource material: Appropriate resource material placed in the hands of trained teachers are an invaluable tool for achieving the goals of EE. What is 'appropriate'needs to be carefully considered. The material needs to be different from traditional text books; it needs to be systematically planned, based on verifiable facts and empirical evidence; and related to the Indian context, issues and problems. At the same time, it must be flexible enough to be adaptable to the situations and needs of individual teachers and students.

Instructional material designed for and addressed directly to students also need to be an important component of the strategy for effective EE. Ideally, the material should encourage students to want to know. In addition to providing factual information, they should help to combine an inquiring mind, curiosity and learning, with some process skills, abilities and techniques which help to satisfy the inquisitive mind and transform curiosity into the confidence brought about by understanding. In addressing children, it would be important to pay attention to age levels which need different approaches in development and presentation.

A wealth of learning objects and settings are available everywhere. The challenge is to transform them into fascinating, exciting, challenging, thought-provoking and answer-providing material and opportunities.

Whether for teachers or for students, these should try to combine participation and enjoyment, while retaining factual accuracy and accountability.

In preparing such material, the interdisciplinary nature of EE demands that along with scientific or technical information, the instructional material must include the elements of social, economic,

aesthetic, ethical and other aspects that all together constitute the environment, and that affect environmental considerations and decision making. They should aim at making the interactions of the students with the environment more conscious,more organized and more scientific. Ultimately this should help students to be more sensitive and to understand how the environment to which they belong can be profoundly influenced by their own actions upon it and how, in turn, the environment influences their own actions and their own life.

Instructional resource material for environmental education should thus not be in the nature of an additional subject or textbook to be crammed into already crowded schedules and curricula. Rather these should be seen as 'user friendly' resources that break down the walls between subject-matter pigeon holes and integrates them for a common purpose—that of enriching learning,broadening perspectives and deepening insights. They must serve to enrich, as well as complement, areas of the existing curricula.

As in all meaningful education, they must lead to the generation of 4 Cs—Curiosity, Creativity, Competence and Compassion. It is the feeling of compassion that must be the basis of an environmental ethic. The fifth C—Conservation—could be a direct consequence of compassion.

CEE has been working in this direction since its inception, with the objective of developing the capacity of various organizations and schools to effectively incorporate EE in their educational programmes.

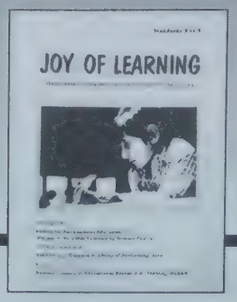
To this end, one of the ongoing programmes has been to develop a variety of instructional and resource material which can be used in formal and non-formal educational situations.

Resource material in the form of compilations of basic concepts, case studies, supplementary books etc. are also being developed. These materials go through a rigorous process of verification, testing, and revision. They are disseminated after orienting or training the potential users in how to use them most effectively.

Each new development and the response to it has led to greater confidence in facing the challenging job ahead. The possibilities are vast and exciting. The tremendous biogeographic, social and cultural diversity of India offers a rich basic resource waiting to be tapped, interpreted and revitalized to suit the needs of environmental education.

Photo: Sunil Jacob

Developing EE Programmes and Material
A Framework



Since its inception in 1985, one of the major thrust areas of CEE's programmes has been Environmental Education for Children. Based on the recognition that understanding of the environment needs to start at the school level, CEE develops, coordinates and conducts a number of programmes aimed at school children. These are grounded in the recognition of the great possibilities, as well as constraints, of the educational system in India. This chapter describes the early thinking and experiments in evolving a suitable framework for EE programmes and material.

It was clear from the outset that it was neither possible nor practical to attempt to develop a uniform educational programme or material for a country as diverse as India. What might be relevant to and work in one region may not work in another. There was also the challenge of reaching out to millions of schools, teachers and students, in over 20 languages, and across a range of school systems.

Evolving Directions

CEE began work by trying to define and lay down the basic principles and guidelines for its efforts towards the goal of creating awareness about the environment among children. CEE's school programmes began to take shape based on the following assumptions:

- EE should not form a separate part of the syllabus but should be integrated with science, social science and other subjects.
- An activity approach is an effective one.
- Activities should not presuppose availability of standard equipment and facilities. Rather, it should be possible to adapt the activities to a variety of situations through use of locally available materials.
- While educational material can be centrally developed, they should be flexible enough to enable the teacher to modify these sufficiently to meet local needs.
- The emphasis initially should be on teacher training and developing classroom material, rather than developing material which can be directly used by students.
- The middle school (Std. V-VII, age group 10-14 years) is a good level to launch the new approach as this is a stage where the students have already grasped the basics of language and mathematics. It is also a stage where students are not yet pressured by the demands of competitive examinations.
- Voluntary agencies acting in collaboration with the State Governments can play a significant role in improving the quality of EE in schools.

Early Experiments

The first attempts at developing programmes and material which incorporated this thinking took the form of a decision to start with Tree and Pond, as two themes, and work out a sequence of environmental education experiences using these as the focal points.

This experiment was initiated on the basis that both themes, although seemingly discrete, did in fact involve an intricate web of interrelationships and connections which were interdisciplinary. It was felt that these could serve as useful starting points for creating awareness about the environment and underlying relationships. The two themes were also universal in applicability in that it was possible to find a tree or a water body almost everywhere. The attempt was to design a programme with enough in-built flexibility to adapt to virtually any situation. It was also felt that such programmes could be applied not only in formal school settings, but also with informal groups, and for facility-specific situations such as zoos, camps, nature parks etc.

Concerns and Considerations

Based on these beliefs, work on the two programmes was initiated. The compilation of

suitable, relevant and accurate information and facts was the first stage. While this was relatively easy, it resulted in the accumulation of vast quantities of assorted information. The challenge was to sort, classify and prioritize this large content base, to meet the requirements of the proposed programme. While there was excitement about incorporating an activity approach, the skill of developing effective activities and the technique of actually writing instructions on how to conduct such activities had to be developed considerably. Furthermore, all the activity ideas had to be clearly linked to the thematic or content matter (information, facts etc.) in order to establish the links between the theory and practice.

As the material began to evolve, it became clear that it would be necessary to provide the teacher with a step-by-step guide to carrying out the programme. In other words, it was taking the shape of a Teacher's Manual. For the authors of the manual, this meant being very clear about the entire programme, sequencing it, and spelling out detailed instructions.

At the same time it meant being conscious of not making the programme so rigid or regimented as to kill the flexibility, creativity and interest of the teacher, and thereby effectively ensuring that the module would not be used.

It meant that every session had to be systematically worked out—from the clearly stated objectives, to the outcomes—indicating the time required, and listing the materials necessary to carry out the session. At the same time it meant taking care not to isolate or compartmentalize sessions or concepts, but rather to emphasize the interconnectedness and continuity in content and methodology.

There was also the realization that, given a setting designed to arouse interest and curiosity, students would make greater demands on teachers who may lack the necessary information or motivation to provide answers, or who may not encourage questions due to lack of confidence in being able to handle the situation. Keeping this in mind it was also planned to develop some basic reference material/information that could be included as part of the material. This, it was felt, could take the form of a chart or booklet about common plants, insects, birds, etc. to help identification and provide information.

Validation Through Trials

While developing the teachers' material was an important part of CEE's work, an equally important part was to validate the material. This was planned through having a series of trials, at three levels:

i) 'Laboratory' trials conducted with students to assess comprehension of content.

ii) Preliminary trials involving teachers who would handle the material on their own. These teachers would earlier have been oriented to the approaches and material.

iii) Network or field trials involving approximately 1000 schools across the country to help evaluate the universal application of the material.

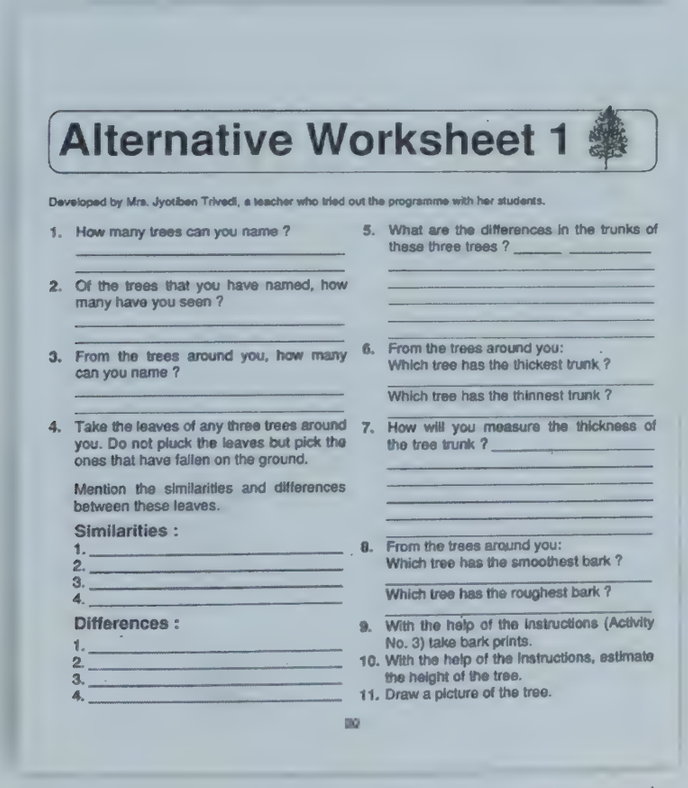
The 'lab' trial run was usually conducted with local students in a non-formal setting (i.e. outside the classroom). The activities were conducted by CEE staff who had been involved in the development of the material. The teachers accompanying the students were observers. As the activities were being tried, students were observed for their reaction to the new approach, attention span, and ease with which the activity could be conducted (following instructions, group work, reaching expected objectives, etc.). An oral discussion with students after the session was used to further clarify or detail students' feedback on the experience as well as ensure that the expected learning outcomes had been achieved.

The programme team noted down all these and used them to make the required modifications in the activities. For example, trials with students sometimes showed that the time proposed for a particular activity was either too much, or insufficient. Or that it was necessary to clearly include and spell out an extra step in the process rather than assume that it would be done automatically, or that the post-activity discussion had to be properly structured for effective consolidation of learning.

The next stage of trying out the revised material was at a series of workshops for teachers. These began with an orientation for teachers about environmental education, as well as the activity approach to teaching and learning. The Tree and Pond modules were then presented as models to demonstrate this approach.

The teachers were then given the activities in writing, and they themselves tried these out. This was followed by discussions in which teachers suggested changes in the material, from the point of view of how best they could use it. At the end of the workshops teachers also filled in questionnaires which invited their feedback on the nature and efficacy of the workshop as a whole, the new approaches, and sample material tried out during the workshop.

The teachers then took the two materials with them to try these out with students in their own formal classroom setting. The teachers not only tried out the activities, they even designed their own worksheets (based broadly on ours) to suit their specific student and location requirements.



Alternative Worksheet 1

Developed by Mrs. Jyotiben Trivedi, a teacher who tried out the programme with her students.

1. How many trees can you name ?
2. Of the trees that you have named, how many have you seen ?
3. From the trees around you, how many can you name ?
4. Take the leaves of any three trees around you. Do not pluck the leaves but pick the ones that have fallen on the ground.

   Mention the similarities and differences between these leaves.

   Similarities :
   1.
   2.
   3.
   4.

   Differences :
   1.
   2.
   3.
   4.
5. What are the differences in the trunks of these three trees ?
6. From the trees around you:
   Which tree has the thickest trunk ?
   Which tree has the thinnest trunk ?
7. How will you measure the thickness of the tree trunk ?
8. From the trees around you:
   Which tree has the smoothest bark ?
   Which tree has the roughest bark ?
9. With the help of the instructions (Activity No. 3) take bark prints.
10. With the help of the instructions, estimate the height of the tree.
11. Draw a picture of the tree.

Worksheet developed by a teacher

In one case, in a school in the heart of a crowded city where it was not easy to find even a single tree, the teacher used potted plants and a small enclosed school garden to carry out the module.

Teachers sent us worksheets filled in by students. They also invited us as observers to their schools, while students were carrying out the activities.

Feedback and Changes

The teachers' response to the new approach was enthusiastic and encouraging. Their suggestions were very valuable and helped us to make small but important changes. For example, to simplify the language and clarify written instructions for activities or worksheets (e.g., a simple suggestion was 'change L/S to Long/Short'). Another valuable suggestion was to fill in one column of the worksheet as a sample.

The material was also tried in a nonformal setting, in this case, a nature camp. Here the activities were administered by CEE staff and volunteers who had been oriented earlier, and also by teachers who had accompanied the students. Several valuable learnings and suggestions came out from this experience. For example, even on small but practical details such as the size of a chart which was clumsy to handle outdoors.

All the trials helped in further modifying, revising, and fine-tuning the material. At a more general level they were valuable experiences that served to clarify our own thinking about a range of effective approaches to EE, and strategies to make these workable.

The process continued with more teacher workshops. Wherever possible, teachers who were participants at earlier workshops were invited as resource persons. Their inputs were invaluable as they could freely share their experiences with their peers, and their enthusiasm was not only evident, but infectious! At times, these teachers also brought with them a few students, and were able to demonstrate the activities to the other teacher-participants.

Pond and Tree thus served not only as pilots for CEE's own understanding of the relatively new field of EE; of exploring new dimensions and

linkages; of experimenting with new approaches and modes of communication; but these also helped greatly to clarify our thoughts and the directions for future programmes.

Expanding the Canvas

The opportunity to put this emerging clarity and confidence to test on a larger canvas came soon after, in early 1986. The National Council for Educational Research and Training (NCERT) requested CEE to provide some material on environment which could be used as part of the NCERT'S massive in-service teacher training programme. This was a timely opportunity for CEE to introduce its basic thinking and approach on EE, to a wider audience. The only concern was that the material was expected to be prepared, compiled, and delivered to NCERT within an impossibly short time (approximately one month)!

To meet this challenge, CEE itself had to devise an action plan. By now CEE was convinced of, and confident about, the validity of the activity approach to environmental education. It was also clear that its EE programmes and material development would be broadly guided by the seven points discussed earlier.

The question was how to put all this in the form of some workable material within the specified time. The strategy that emerged took the shape of an intensive workshop for developing and writing EE activities. The participants included CEE staff as well as other resource persons, and also members from CEE's sister institutions—VIKSAT, Vikram A. Sarabhai Community Science Centre (VASCSC), and Centre for Health Education Training and Nutrition Awareness (CHETNA).

Each of these institutions had a rich and varied experience in developing educational programmes and material. It was felt that these experiences could be shared, enriching the workshop, and bringing a synergy to the process.

This multidisciplinary resource base provided fertile ground for many new and exciting activity ideas. Ideas were discussed in groups, written up by individuals, presented to and reviewed by a larger group at the end of each day. Those which were accepted were then edited and uniformly formatted into activities by a smaller editorial group.

Much of the feedback on the 'workability' of an activity—in terms of content, objectives, methodology, and written communication, was based on the extensive experience of the different participants in their own areas of work, as well as the more recent experiences of the trials of Pond and Tree activities.

Simultaneously, the Centre's Graphic Design Studio was working to evolve a design and look for the material that would be attractive, appealing, and easy to use.

For two weeks, the process continued, virtually round the clock.

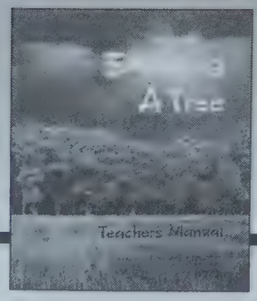
Joy of Learning is Born

At the end of three weeks, *Joy of Learning* (JOL) was born. Fresh off the press, this publication marked CEE's first significant step in the development of EE material in keeping with its basic philosophy and approach to EE.

This handbook of 75 environmental activities is designed to be used mainly at the primary level (8-10 years age group). The activities span a number of different aspects of environment and are indicative of the type of approach CEE was visualizing. It is not meant to be a comprehensive curriculum nor a prescription of activities to be done in school. Rather, it is designed to provide a framework and approach that teachers could use to develop a number of other activities, based on their specific requirements and situations.

The opportunity to develop *Joy of Learning* provided CEE not only with the chance to share its approach with a much wider audience, but also the opportunity to enter the mainstream of formal education through the NCERT's programmes. Today there are about 1,50,000 copies of *Joy of Learning* in several languages, in circulation. It has been translated into at least half a dozen languages. Even over a decade later, *Joy of Learning* continues to be CEE's keystone EE publication.

Preparing a Teacher's Manual



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The teacher has a great role in planning and arranging learning conditions and guiding learners' thinking in a desired direction. For designers of EE material, the concern has been how to provide for the ordinary teacher, wary of handling unfamiliar material and approaches, and faced with a number of operational problems, a core of material which enables her/him to arrange a series of worthwhile learning experiences for students.

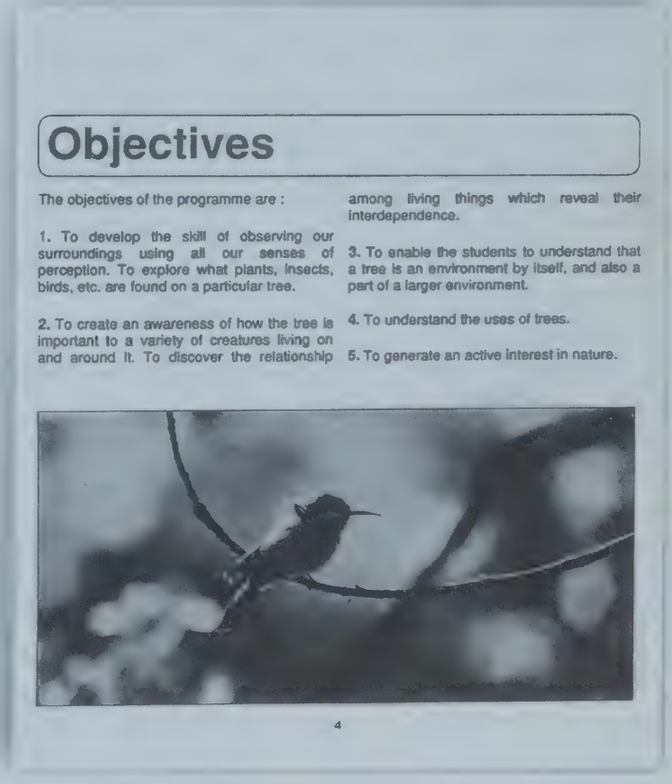
Guidelines for teachers indicating the type of learning conditions that could be organized to bring about necessary behavioural changes in learners, and alternative ways of sequencing them, could be presented in the form of a manual. To be useful and effective such a manual should contain the teaching and learning strategy; the instructional objectives; the relation between the specific objectives and the concepts to be covered; a clear description of the instructional components being suggested, and the merits and drawbacks of the use of each component. It should also include a framework within which the instruction can be organized for greater effectiveness, a glossary of technical terms, and general directions for administering the module. Each of these components is discussed below.

Level

The age or class level for which the programme is designed should be mentioned at the beginning. This would indicate to the teacher what learner characteristics are being considered for the content and other components. These characteristics would be in terms of the students' language facility, facility with thinking and observation, the previous knowledge of students at that level etc. The age range, however, is not absolutely rigid. The teacher may be given the option of using the programme with a slightly lower or higher level, if he/she thinks fit. It must be remembered that each teacher knows best the level of his/her students in terms of pre-knowledge, interest and exposure and can also simplify/extend the activities to suit the level of his/her students.

Objectives

The teacher's manual must clearly state the objectives sought to be covered by the programme. The teacher should be informed how the module is likely to contribute to a particular topic, how it can add to the existing knowledge, skills and attitudes of the students. By going through the objectives, the teacher should be oriented right at the beginning about what the programme aims to achieve.



Objectives

The objectives of the programme are :

1. To develop the skill of observing our surroundings using all our senses of perception. To explore what plants, insects, birds, etc. are found on a particular tree.

2. To create an awareness of how the tree is important to a variety of creatures living on and around it. To discover the relationship among living things which reveal their interdependence.

3. To enable the students to understand that a tree is an environment by itself, and also a part of a larger environment.

4. To understand the uses of trees.

5. To generate an active interest in nature.

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Page from *Exploring a Tree*

The manual should specify the instructional objectives of the programme. The objectives could be general as well as specific. They would include concepts to be learnt and skills to be developed.

Each objective must be stated concisely, specifically and clearly and should cover one concept at a time rather than trying to communicate two or three concepts at a time. The objective should clearly state the behaviour that is desired as an outcome of the instruction. This would be in terms of what the students are expected to discover and how they will use or apply what they discover.

The outcome specified should be attainable and measurable. The conditions under which the outcome is expected should be stated unambiguously.

Content

There must be a note at the beginning of the manual which briefs the teacher about the subject, topic or area that the programme aims to cover. The teacher should also understand why that area is being taken up as a subject for study and its relevance, in terms of the curriculum, as well as in the broader context of the better understanding of the environment.

The specific concepts which the programme aims to develop should also be clearly explained. It is important that the treatment of concepts should be such that there is a step-wise development from the concrete to the abstract. It is usually easier to lead the students from the familiar to the new.

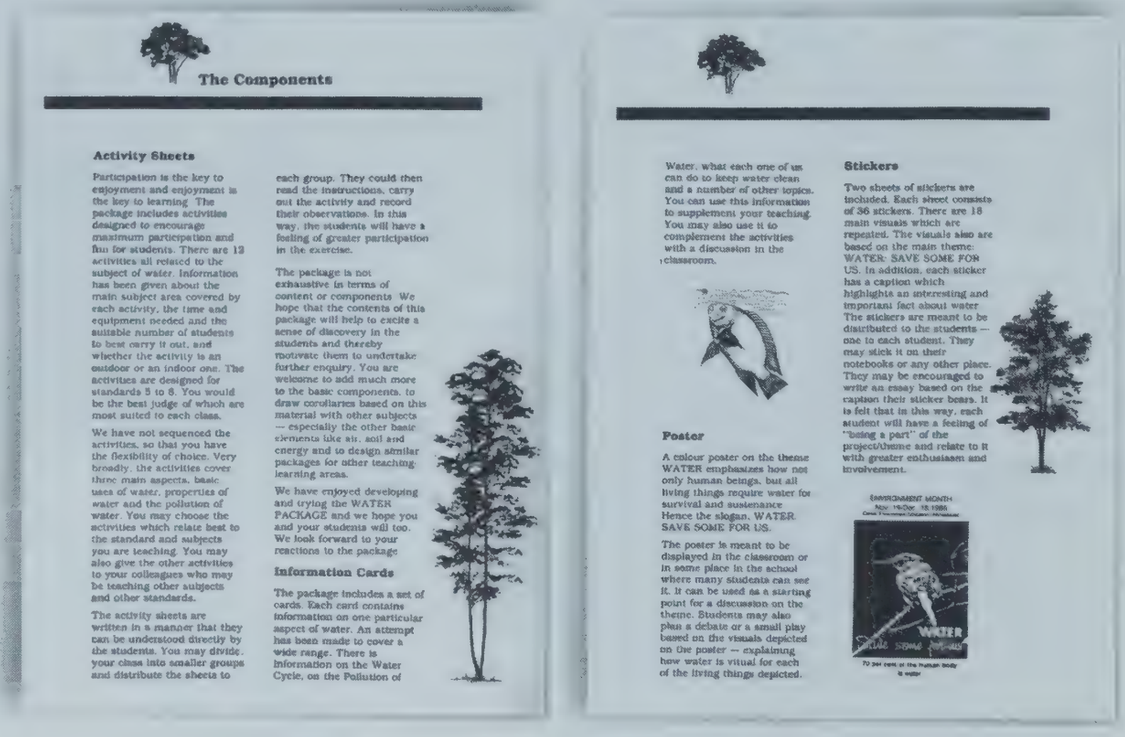
The linkages of the concepts must be made clear. The concepts need to be linked not only vertically in terms of their development in the same discipline, but also horizontally in terms of relations with concepts from other disciplines.

The manual could also demonstrate how contents could be used in explaining, illustrating, or enhancing aspects of other disciplines. Thus the teacher should be encouraged to make use of the contents not only to supplement the curricular teaching in a particular subject, but also the application in other subjects. This could be done by giving examples at relevant places in the manual of how the links could be established.

Components

Having clarified what to teach, in terms of the objectives and concepts to be covered by the programme, the manual must also discuss the appropriate methods which would help in achieving these aims. These different methods might necessitate the development of different components.

The introduction of a variety of components in the programme demands that the teacher's manual must give a description of each component, an exposition of what each component comprises, what it is likely to achieve, and what is the most effective way of using a particular component in the particular context. The manual must give a justification for the choice of a particular



The Components

Activity Sheets

Participation is the key to enjoyment and enjoyment is the key to learning. The package includes activities designed to encourage maximum participation and fun for students. There are 12 activities all related to the subject of water. Information has been given about the main subject area covered by each activity, the time and equipment needed and the suitable number of students to best carry it out, and whether the activity is an outdoor or an indoor one. The activities are designed for standards 5 to 8. You would be the best judge of which are most suited to each class.

We have not sequenced the activities, so that you have the flexibility of choice. Very broadly, the activities cover three main aspects, basic uses of water, properties of water and the pollution of water. You may choose the activities which relate best to the standard and subjects you are teaching. You may also give the other activities to your colleagues who may be teaching other subjects and other standards.

The activity sheets are written in a manner that they can be understood directly by the students. You may divide your class into smaller groups and distribute the sheets to each group. They could then read the instructions, carry out the activity and record their observations. In this way, the students will have a feeling of greater participation in the exercise.

The package is not exhaustive in terms of content or components. We hope that the contents of this package will help to excite a sense of discovery in the students and thereby motivate them to undertake further enquiry. You are welcome to add much more to the basic components, to draw corollaries based on this material with other subjects — especially the other basic elements like air, soil and energy and to design similar packages for other teaching-learning areas.

We have enjoyed developing and trying the WATER PACKAGE and we hope you and your students will too. We look forward to your reactions to the package.

Information Cards

The package includes a set of cards. Each card contains information on one particular aspect of water. An attempt has been made to cover a wide range. There is information on the Water Cycle, on the Pollution of Water, what each one of us can do to keep water clean and a number of other topics. You can use this information to supplement your teaching. You may also use it to complement the activities with a discussion in the classroom.

Stickers

Two sheets of stickers are included. Each sheet consists of 36 stickers. There are 18 main visuals which are repeated. The visuals also are based on the main theme: WATER: SAVE SOME FOR US. In addition, each sticker has a caption which highlights an interesting and important fact about water. The stickers are meant to be distributed to the students — one to each student. They may stick it on their notebooks or any other place. They may be encouraged to write an essay based on the caption their sticker bears. It is felt that in this way, each student will have a feeling of "being a part" of the project/theme and relate to it with greater enthusiasm and involvement.

Poster

A colour poster on the theme WATER emphasizes how not only human beings, but all living things require water for survival and sustenance. Hence the slogan, WATER: SAVE SOME FOR US.

The poster is meant to be displayed in the classroom or in some place in the school where many students can see it. It can be used as a starting point for a discussion on the theme. Students may also plan a debate or a small play based on the visuals depicted on the poster — explaining how water is vital for each of the living things depicted.

ENVIRONMENT MONTH

WATER

Pages from Water Package manual

component. It could be that it is more effective, more presentable, likely to create interest and motivate students. It is important that it contributes to meeting the objective for which it is being used. The sequence in which the components are used in the programme should be clearly explained in the manual.

A variety of components may be used, ranging from printed material, demonstrations or discussion, to field trips, classroom or outdoor activities, audio-visual aids, role-playing, games, etc.

In each case, the teacher must be familiarized with the content characteristics, method of use and advantage of the component. For example, activities may be effective to explain certain concepts, as they involve active and direct participation of students.

There is no fixed rule about the number or variety of components which must go into each programme. The suitability of the component to the purpose of the programme is the main criterion.

Involvement of the entire class in the development of simple teaching/learning aids is an effective way of arousing curiosity, interest and involvement of learners from the very start, often before the introduction of the concept itself. Thus students can plan from the beginning and participate in the planned programme by contributing their own interests, skills, and previous knowledge.

Framework of the Instructional Event

Session Plan: Even in learning by discovery, it is necessary that teachers as well as students have a framework within which the process of discovery can take place. The preparation of the plan of work and how it is carried out concerns teachers and students equally. A major advantage of having some degree of structure is that it brings order to the sequence of learning experiences.

In case of a programme which is planned to continue over a period of time (e.g. a week, a month, a term), the division of the programme into sessions can assist teachers by providing a logical flow of activities and ideas. The teacher's manual should indicate at the beginning how many sessions the programme has been organized into.

The approximate time that each session is likely to take should be indicated.

The purpose and objectives of each session must be spelt out. This could be in the form of directions about what the students are expected to do during the time allocated for the particular session and also what they are expected to discover or learn by the end of the session.

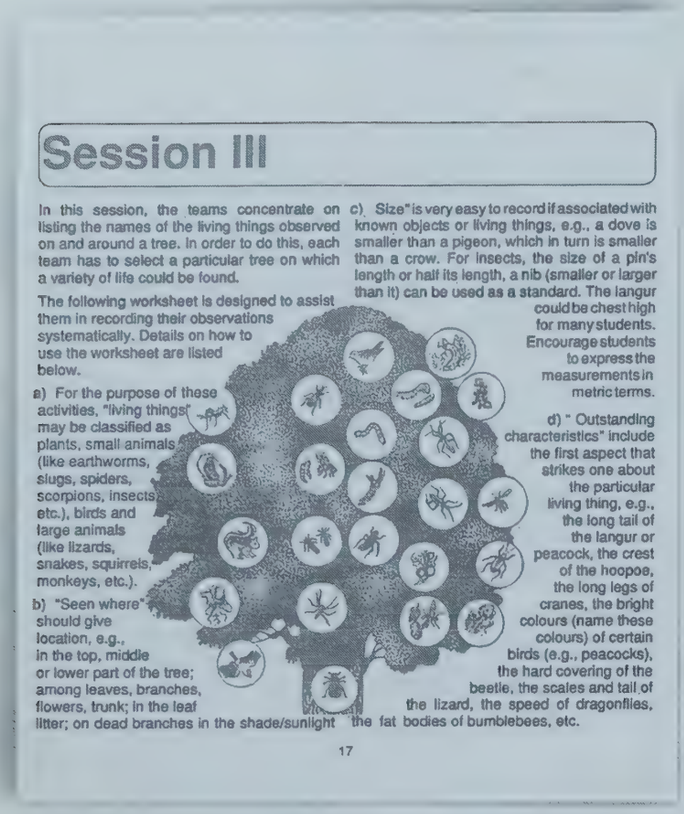
The procedure for organizing and conducting each session needs to be explained clearly. This would include the venue of the session (i.e. classroom, laboratory, outdoors etc.); pre-session preparation required on part of teacher and students; whether the session involves the class as a whole or the division of students into smaller groups; the components to be used for the session; and any other relevant instructions and information.

In case the session includes the use of any component such as activity cards, worksheet etc., a description of the component to be used during the session, the relevance of the component to that particular context, as well as clear instructions about how to use the component must be given. There should also be an indication about how that particular component fits in with the other components which form part of the module. The teacher may be given some idea about how to initiate a session, which component would help to spark the curiosity and interest of the students and lay the ground for the rest of the session.

The expansion of experience, by means of sessions, should be directed from the familiar to the unfamiliar, through stages of observation, recording, organization, sequencing and evaluation. The sessions should be sequenced so that the new knowledge or interest gained by the students through a series of experiences is an outgrowth of their previous concepts and interests.

Every session must stop at a stage where the particular objective and concept aimed at have been covered. It should be a suitable juncture to consolidate the experiences of that session.

An indication must be given to the teacher at which points he/she can break the continuity of



Session III

In this session, the teams concentrate on listing the names of the living things observed on and around a tree. In order to do this, each team has to select a particular tree on which a variety of life could be found.

The following worksheet is designed to assist them in recording their observations systematically. Details on how to use the worksheet are listed below.

a) For the purpose of these activities, "living things" may be classified as plants, small animals (like earthworms, slugs, spiders, scorpions, insects etc.), birds and large animals (like lizards, snakes, squirrels, monkeys, etc.).

b) "Seen where" should give location, e.g., in the top, middle or lower part of the tree; among leaves, branches, flowers, trunk; in the leaf litter; on dead branches in the shade/sunlight

c) Size" is very easy to record if associated with known objects or living things, e.g., a dove is smaller than a pigeon, which in turn is smaller than a crow. For insects, the size of a pin's length or half its length, a nib (smaller or larger than it) can be used as a standard. The langur could be chest high for many students. Encourage students to express the measurements in metric terms.

d) " Outstanding characteristics" include the first aspect that strikes one about the particular living thing, e.g., the long tail of the langur or peacock, the crest of the hoopoe, the long legs of cranes, the bright colours (name these colours) of certain birds (e.g., peacocks), the hard covering of the beetle, the scales and tail of the lizard, the speed of dragonflies, the fat bodies of bumblebees, etc.

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Page from *Exploring a Tree*

the session but still maintain the logicality of the sequence of the session as well as of the entire programme. Each session should be designed in such a way that while it is definitely linked to the preceding and succeeding sessions, it can stand as an independent unit.

The manual must underline the importance of consolidation. While the students' attention may be caught, and their perception and participation be keen, most students find it hard to connect up their activities, observations and discoveries. Many of the facts they learn remain just apparently isolated facts. Through consolidation of observations and experiences, it is the teacher who must pass the thread of interest and energy through the facts. This could be done while they are being learnt, and afterwards, in a manner such that they become interconnected and acquire a meaning in their interrelatedness.

The manual should encourage the teacher to take part in the investigations of the students as an equal, although more experienced partner. In the process they can disclose relationships with other objects, events or earlier experiences which students may otherwise have missed.

If any long-term projects are to be included as optional activities which could be carried out by the class, the details of the project must be given. This should include the information about the objectives of the project, how to prepare for the project and how to carry out the project.

Flexibility

While the teacher's manual should provide a framework or structure which helps to bring order to the sequence of learning experiences, it must be borne in mind that the manual is to be used in many different contexts of learning. This contextual variable demands that the manual must have an in-built flexibility.

The introduction to the manual should make it clear that the text presented need not be followed like a recipe. Each part can be adapted in a way that the teacher thinks will make it better. Teachers must be convinced that if they use something that they modify or make, they will do a much better job of teaching it than if they just follow a ready-made teaching plan. By involving themselves in the process, they will continually gain in understanding, appreciation, and commitment. The way they use the module is left to their creativity.

The teachers know best the environment of their students, their interests and background and their stage of intellectual development. Each teacher is also best aware of the constraints of his/her own situation, e.g. constraints of resources, lack of equipment, overcrowding of classes, and his/her own unfamiliarity with the subject. There may be many other problems faced by the teacher, of which the writers of the manual may not be aware.

The manual should encourage teachers to feel free to use the material in the way that they think most suitable to their context, once they themselves are clear about the aims and framework of the module.

Teachers could be given the option to choose, from among the activities, those that they find most suitable to the level of their students and in keeping with the facilities and resources available to them. Wherever possible, the manual itself should give one or more options in terms of use of equipment, location, material etc. The manual could also give the choice to the teacher to be

able to change the sequence of the sessions. However, it must caution that this would be desirable provided that ultimately the teacher is able to build up the links and consolidate the programme in keeping with its objectives.

The manual would actively need to encourage the teacher to innovate, develop and use teaching aids or other material which fulfil the aim of the module. Teachers could themselves develop aids or they could involve the students in the development of the same. The use of a number of examples, as well as inclusion of some of the experiences of the writers of the module, could help to set a participatory tone.

It is important that the teachers are encouraged to draw case studies, examples and experiences from their immediate and familiar environment. The students themselves, the immediate school environment and the neighbouring environs can present teachers with raw material for an exciting and effective implementation of the module.

About this package

Dear Teacher,

You have before you an educational package containing a variety of material which can be used as teaching-learning aids.

The theme of the package is WATER. WHY DO WE STUDY ABOUT WATER? Millions of years ago, life began in water. All living things constantly have to seek water to survive. Three-fourths of the world is covered with water. Almost 70 per cent of the human body is made up of water.

WATER is essential for all life functions. Yet, how often during the course of our daily life do we stop to consider the role of water in the innumerable aspects of our day-to-day existence?

India has a rich natural network of water bodies — majestic rivers, jewel-like lakes, gushing waterfalls and the longest coastline. How much thought have we given to the immense potential of these water bodies? Water becomes news only when there is too much of it (floods) or too little of it (drought) or careless use of it (pollution).

It is time for us all to become aware of this precious resource, to learn more about it and to try and prevent it from being polluted.

Students learn about water at different levels and in different contexts. Each subject deals with WATER from a particular point of view.

This water package is an attempt to integrate the many aspects of this extensive subject in an interesting and informative manner. The material is not restricted to any one discipline but tries to touch upon a number of areas. Thus, they can be used in a number of different contexts. You can choose a particular component to suit what you are teaching, and where and when you think it would be most effective to supplement the teaching-learning experience for yourself and your students.

The package is not designed specifically for a particular standard. Broadly the material may be used for standards 5 to 8. You may decide on the combination and use of the material keeping in view the level of your students in terms of what they already know, their interest and the time and facilities at your disposal. You are also free to use the material with a slightly lower or higher age-group if you think it would be useful. The packet is designed to be interactive, in the sense that the students are encouraged to interact directly with the components — both visual as well as printed matter. Each teacher and each group of students can use the material/package in their own way, thereby sharing a unique experience.

Page from Water Package manual

While the teacher's manual would serve as the basic guideline for teachers all over the country, it should at the same time, due to its in-built flexibility, be capable of being adapted or changed into each teacher's and each student's own teaching-learning experience.

Illustrations

The use of illustrations at certain places in the manual helps to make it more interesting as well as informative.The choice of visuals would depend upon the content of the manual. In most places, simple line drawings would be effective. Use of photographs may be useful in certain contexts.

Visuals which supplement the text in the manual at the appropriate places can make the explanation more vivid. It makes it easier for the teacher to visualize what is written.

When several components are included in the module, a visual of what the particular component looks like should be included in the manual where the component is being discussed. This helps the teacher to immediately relate the text in the manual to the corresponding component of the module. If activity cards are a component of the module, the section of the manual where the activities are described may be illustrated. Each activity in the manual may have a small visual corresponding to that in the card with the same activity.

Illustrations could be useful when explaining an experiment, especially one that requires use of some equipment.

Where simple teaching aids are to be presented as a part of the module itself, relevant illustrations demonstrating the steps may be useful. Any maps, plans or charts, if necessary for the programme, may also be included.

Language

The language used in the manual is very important. If the language is too difficult or the tone patronizing, the teacher may get prejudiced towards the programme even before he/she explores and examines its contents. Also, the confidence of the teacher must be gained, as well as built up, so as to encourage the teacher to experiment and innovate with the programme. The

language needs to be simple and the tone conversational. Instructions must be clear and concise. It is best to communicate ideas in the language most familiar to the teacher. Rather than ordering the teacher to carry out instructions, his/her co-operation in implementing the programme must be sought. It should make the teacher feel that he/she is 'one of the team' in a common project.

In the Indian context the possibility of easy translation into the various regional languages must also be kept in mind.

Glossary

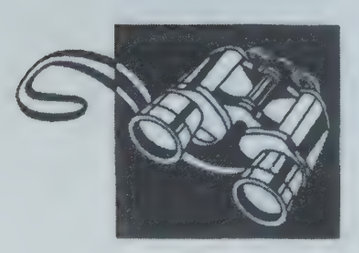
If the programme deals with a subject where a number of scientific terms are introduced and used, the manual must include a glossary of the scientific or technical terms used.

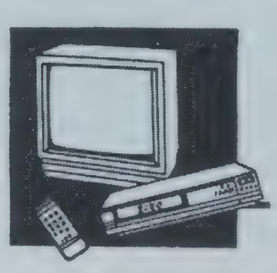
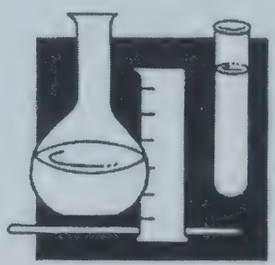
It should be suggested to the teacher that the concept, rather than the term, should be introduced first to the students. Having understood the concept, the students will find it meaningful to give it a name.

It may be counterproductive to teach students scientific labels for concepts before the concepts themselves are acquired.

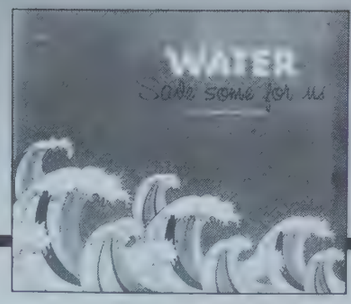
Useful Pointers

- Guidelines to the teachers regarding the organization and conducting of activities, both in and out of the classroom, should be given at the relevant places in the manual.
- The amount and type of preparation required by the teacher as well as the students in order to commence the programme must be explained. This preparation may be in terms of finding a suitable location for an outdoor session, working out the logistics of such sessions in terms of resources and facilities, possible seasonal preferences etc.
- If the programme involves the use of equipment and material, whether for experiments or field trips or classroom exercises, a comprehensive list of such material would be useful. Wherever possible, alternatives for the material could be suggested so that the programme is not held up due to the lack of one or other item required for an exercise.
- The manual should give hints to teachers about the appropriate time and way to intervene in order to take the learning of the students towards the objective of the programme, to guide their activities and attention in a new direction, to create opportunities for investigation, or to point out what deserves special attention.
- The manual must guide the teacher in such a way that it not only helps the students to achieve the aim of a particular exercise but also conduct the follow-up to the exercise. This could pave the way for the acquisition of a common experience and for exchanges between students which lead to questions, discussion of the way the students look at phenomena, and difficulties in applying the acquired knowledge to a wider context.
- In order to facilitate an effective follow-up, the manual may give a list of possible questions that the teacher may raise, leading to the above, or to initiate and draw the students into a discussion. There may also be a list of possible questions which may be raised by students, to help teachers prepare themselves.
- In order to raise and answer such questions, or to clarify his/her own doubts, the teacher needs additional information regarding the subject. This information may be included in the manual. This should be accompanied by information about where and how to get access to the references.



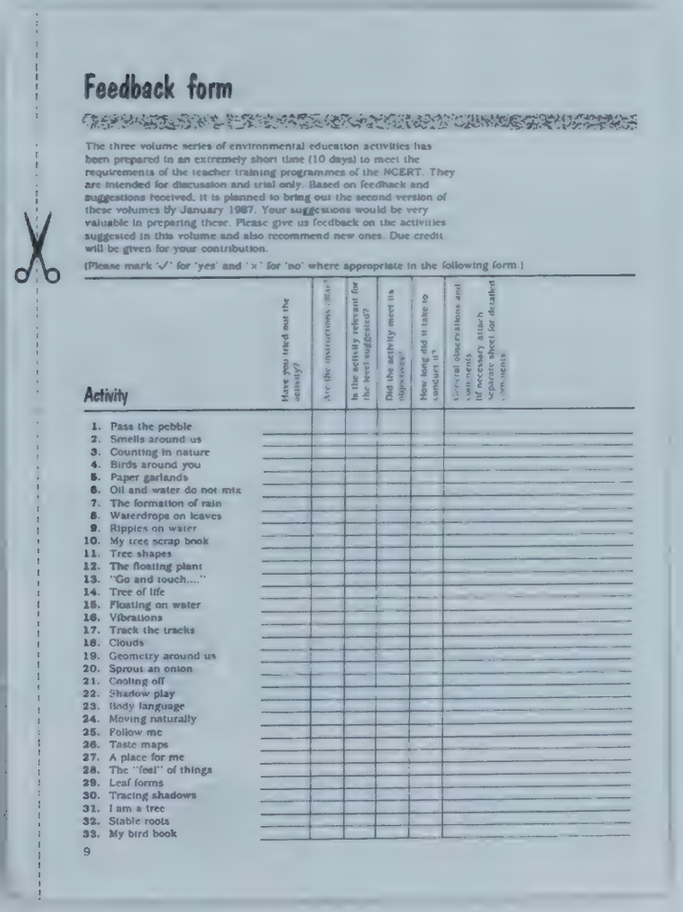
Developing Educational Packages
Some Experiences



Background

In 1986, CEE got an opportunity to develop a theme-based educational package when the Ministry of Environment and Forests, Government of India initiated a programme called the National Environmental Awareness Campaign (NEAC), a month-long effort to create awareness about the environment. 'Water' was announced as the theme for NEAC '86 and CEE was given the responsibility of reaching out to schools.

Joy of Learning (JOL), a handbook of environmental activities, had already been brought out by CEE and was in wide circulation by that time. JOL incorporated a feedback form which we had hoped would help us understand whether teachers were using the activities in the handbook, whether they were finding them useful and what problems they were having. However, hardly one or two filled-out forms came back to CEE!



Feedback form

The three volume series of environmental education activities has been prepared in an extremely short time (10 days) to meet the requirements of the teacher training programmes of the NCERT. They are intended for discussion and trial only. Based on feedback and suggestions received, it is planned to bring out the second version of these volumes by January 1987. Your suggestions would be very valuable in preparing these. Please give us feedback on the activities suggested in this volume and also recommend new ones. Due credit will be given for your contribution.

(Please mark '√' for 'yes' and '×' for 'no' where appropriate in the following form.)

Activity	Have you tried out the activity?	Are the instructions clear?	Is the activity relevant for the level suggested?	Did the activity meet its objectives?	How long did it take to conduct it?	(Critical observations and comments. If necessary attach separate sheet for detailed comments)
1. Pass the pebble						
2. Smells around us						
3. Counting in nature						
4. Birds around you						
5. Paper garlands						
6. Oil and water do not mix						
7. The formation of rain						
8. Waterdrops on leaves						
9. Ripples on water						
10. My tree scrap book						
11. Tree shapes						
12. The floating plant						
13. "Go and touch...."						
14. Tree of life						
15. Floating on water						
16. Vibrations						
17. Track the tracks						
18. Clouds						
19. Geometry around us						
20. Sprout an onion						
21. Cooling off						
22. Shadow play						
23. Body language						
24. Moving naturally						
25. Follow me						
26. Taste maps						
27. A place for me						
28. The "feel" of things						
29. Leaf forms						
30. Tracing shadows						
31. I am a tree						
32. Stable roots						
33. My bird book						

9

Feedback form from JOL

While this worried us initially because we thought that this indicated that the book was not being used at all, subsequently we learnt that this was not so. When we personally met NGOs or teachers who had the book, we found that indeed they were using it and had a lot of feedback to give us. Most of them found most activities useful and were very happy with them; they also had a number of concrete suggestions. When we asked them why they had not sent us the filled-out feedback form, we found there were several reasons, including that:

- Some found forms too structured and intimidating;
- Some felt hesitant about filling out the form since they had tried only 4-5 out of the 75 suggested activities;
- Some did not want to write negative comments;
- Some said they did not have the time;
- Some did not even notice the forms;
- Some did not think it would really matter whether they sent the forms or not.

However, personal discussions with many users helped us get insights and useful suggestions, which helped us in visualizing and planning the Water Package which we wanted to bring out to reach schools during NEAC '86.

The Water Package

We decided that the Water Package should have three components: a teachers' component; a classroom component; and a students' component. It was in developing each of these that the feedback for the JOL experience helped.

The Teachers' component consisted of a manual of 12 activities related to water, and information cards on various aspects of water. The feedback from JOL had indicated that the format of the activity pages and the way activities were written up was found to be user-friendly. Teachers appreciated the side column indicating details like how large a group could participate in the activity, what materials were required, etc. This served as a check-list and helped them plan for the activities without having to spend too much time. So we decided to retain this format.

However, many users did indicate that they would like more specific information and facts as a background to the activities they were to do. Often, during the course of doing activities from JOL, students got very interested and excited and wanted to get more and more in depth into the concepts and issues being discussed. Teachers, in such a situation, often found that they did not have an adequate information/ knowledge base. It was in this context that we decided to include the 16 information cards on various aspects of water. These were such that if the teachers read them, the cards would provide a background for answering questions, and in the discussion.

The students' component consisted of a sheet of 36 attractive labels based on photographs of flora and fauna. We thought that if each student in the class could get one, they could affix them on one of their books and they would be reminded of the Campaign (see page 19).

The classroom component consisted of a colour poster with 16 photographs of flora and fauna, with the message "Water: Save Some for Us". It was felt that this could be put up in the classroom to help start discussions on how not just humans but all other life forms also need water.

All these components were physically put in an attractive paper cover. All the material was brought out in Hindi and English.

Feedback

Close to 5000 teachers were trained in NEAC '86 and given the Water Package, as were several non-governmental organizations.

As with JOL, very little written feedback came in. But as before, when we met and interacted with users, we got a lot of feedback. Some important learnings were that most teachers felt that while it was good that information cards had been added, it was not easy to figure out which card related to which activity. To begin with, there are 16 cards and 12 activities. Further, the titles of the activities and those of the cards did not match. Hence it took a lot of preparation time on the part of the teacher to be able to make effective combined use of the two components.

Regarding the poster, the feedback was that while it was attractive, it was not found to be really useful. In fact, it created some problems for the teacher. The overall slogan 'Water: Save Some for Us' was not very clear to the children. They could not quite understand why there were pictures of seemingly unrelated things like a flower, a tiger, an elephant, etc. on a poster related to water.

Labels from Water Package

We had not even put an explanatory note for the teacher about how to show the connection. Moreover, many flowers, animals, birds etc, had been shown and the children were naturally curious to know the names of these. This was not indicated anywhere on the poster, nor had the teachers been given this information. Hence the teachers did not really feel comfortable with this.

The student material in the form of labels was very attractive. Maybe too attractive—because often they did not reach the students at all. Sometimes, they were put away in a cupboard and locked up for 'special occasions'. Sometimes the sheet of labels was put up like a poster on the school notice board. In some cases, they may even have been taken home!

A feedback on the physical packaging was that the paper envelope that the components were put into often came apart after a short time and could not really take the type of wear and tear involved in school use.

Moreover, the fact that there were so many seperate cards made it difficult to keep track of the complete set. Often, during the course of use in the classroom, one or two information cards would get misplaced; or the entire poster would go missing.

Floods and Drought Package

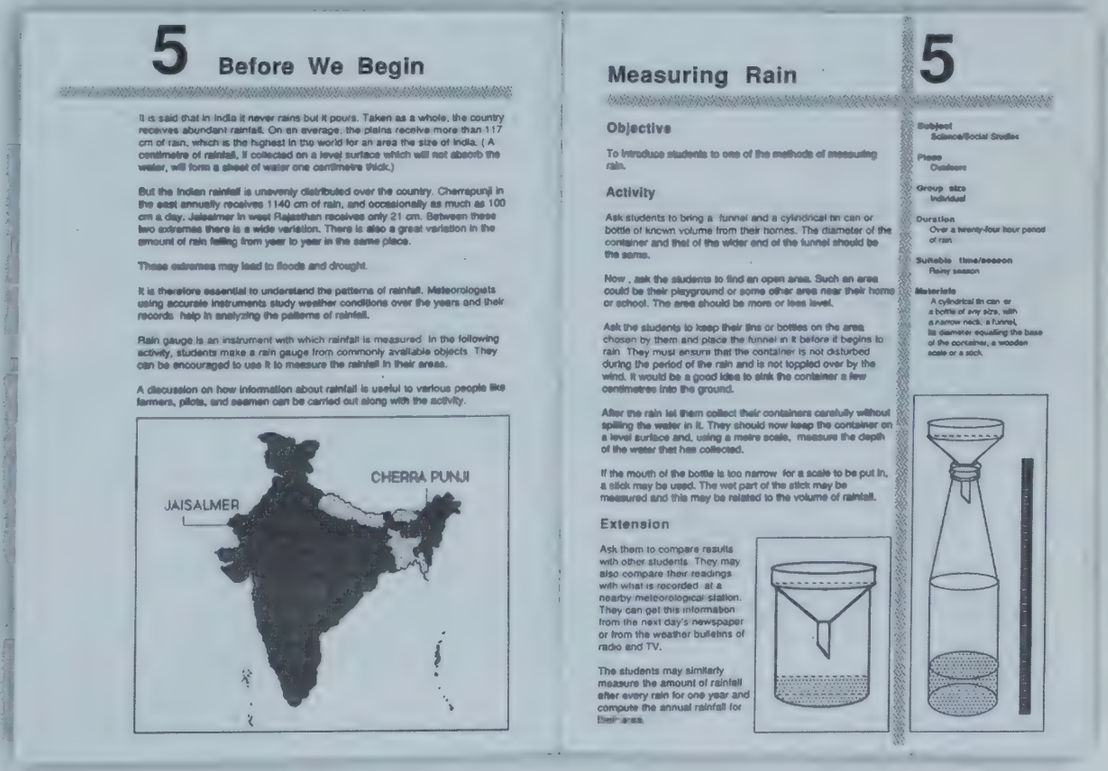
On reviewing these comments, we felt that many of them were fair. NEAC'87 gave us a chance to put these learnings to test. The Ministry of Environment and Forests announced the theme of NEAC'87 as 'Floods and Drought'. As before, our task was to develop material for schools, and to train teachers.

This time too, we developed a teacher's manual. But keeping in mind the feedback, we incorporated the background information within the manual itself. Now, as the manual opened, on the left hand side was a section called 'Before we Begin' which gave basic information about the related activity given on the facing page. Wherever necessary, diagrams and sketches were given to help the teacher understand how to do the activity.

We also changed the focus of the activities—from just helping children understand concepts, these activities also helped them develop skills of scientific measurement, of making models, etc.

This time, rather than having one very colourful poster for a single classroom, we decided to have a set of posters in two colours, which could be used as an exhibition both in the class and the community.

These posters dealt with the grim phenomena of floods and drought and attempted to explain why



5 Before We Begin

It is said that in India it never rains but it pours. Taken as a whole, the country receives abundant rainfall. On an average, the plains receive more than 117 cm of rain, which is the highest in the world for an area the size of India. (A centimetre of rainfall, if collected on a level surface which will not absorb the water, will form a sheet of water one centimetre thick.)

But the Indian rainfall is unevenly distributed over the country. Cherrapunji in the east annually receives 1140 cm of rain, and occasionally as much as 100 cm a day. Jaisalmer in west Rajasthan receives only 21 cm. Between these two extremes there is a wide variation. There is also a great variation in the amount of rain falling from year to year in the same place.

These extremes may lead to floods and drought.

It is therefore essential to understand the patterns of rainfall. Meteorologists using accurate instruments study weather conditions over the years and their records help in analyzing the patterns of rainfall.

Rain gauge is an instrument with which rainfall is measured. In the following activity, students make a rain gauge from commonly available objects. They can be encouraged to use it to measure the rainfall in their areas.

A discussion on how information about rainfall is useful to various people like farmers, pilots, and seamen can be carried out along with the activity.

JAISALMER

CHERRA PUNJI

Measuring Rain

5

Objective

To introduce students to one of the methods of measuring rain.

Activity

Ask students to bring a funnel and a cylindrical tin can or bottle of known volume from their homes. The diameter of the container and that of the wider end of the funnel should be the same.

Now , ask the students to find an open area. Such an area could be their playground or some other area near their home or school. The area should be more or less level.

Ask the students to keep their tins or bottles on the area chosen by them and place the funnel in it before it begins to rain. They must ensure that the container is not disturbed during the period of the rain and is not toppled over by the wind. It would be a good idea to sink the container a few centimetres into the ground.

After the rain let them collect their containers carefully without spilling the water in it. They should now keep the container on a level surface and, using a metre scale, measure the depth of the water that has collected.

If the mouth of the bottle is too narrow for a scale to be put in, a stick may be used. The wet part of the stick may be measured and this may be related to the volume of rainfall.

Extension

Ask them to compare results with other students. They may also compare their readings with what is recorded at a nearby meteorological station. They can get this information from the next day's newspaper or from the weather bulletins of radio and TV.

The students may similarly measure the amount of rainfall after every rain for one year and compute the annual rainfall for their area.

Subject
Science/Social Studies

Place
Outdoors

Group size
Individual

Duration
Over a twenty-four hour period of rain

Suitable time/season
Rainy season

Materials
A cylindrical tin can or a bottle of any size, with a narrow neck, a funnel, its diameter equalling the base of the container, a wooden scale or a stick.

Pages from *Floods and Drought* manual

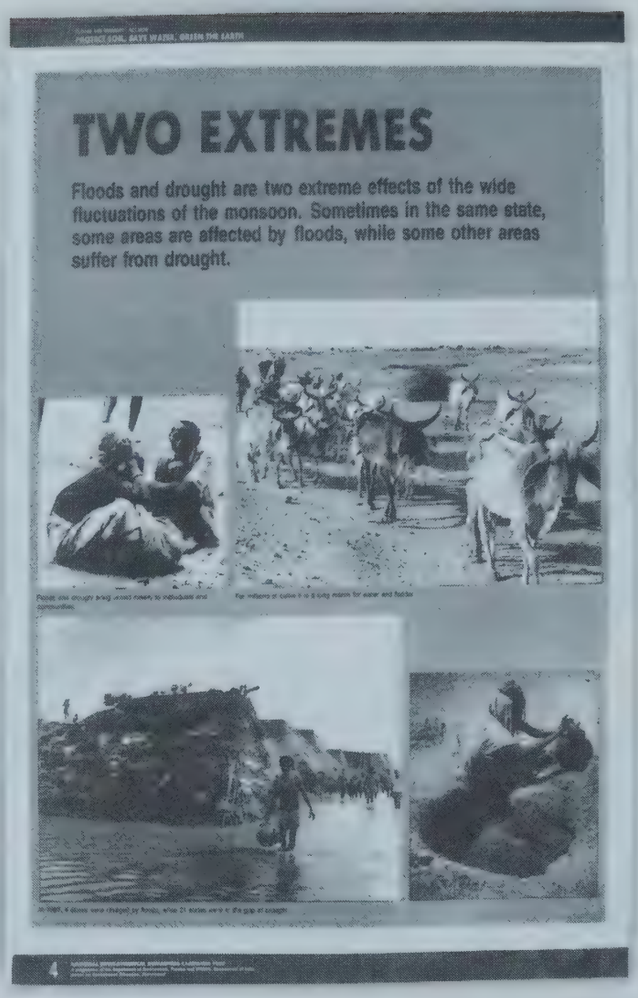
they occur, how human activities increase the severe impacts, and what we can do. The format was large, so as to be suitable for an exhibition, and the text was kept to a minimum.

At the four corner of the posters, eyelets were made, and a long string provided. Users could string up the posters and an exhibition could come up anywhere! It was also suggested that the text of the posters could be translated and written on a piece of chart paper and attached to the bottom eyelets. All these suggestions were given in a small pamphlet put in with the posters.

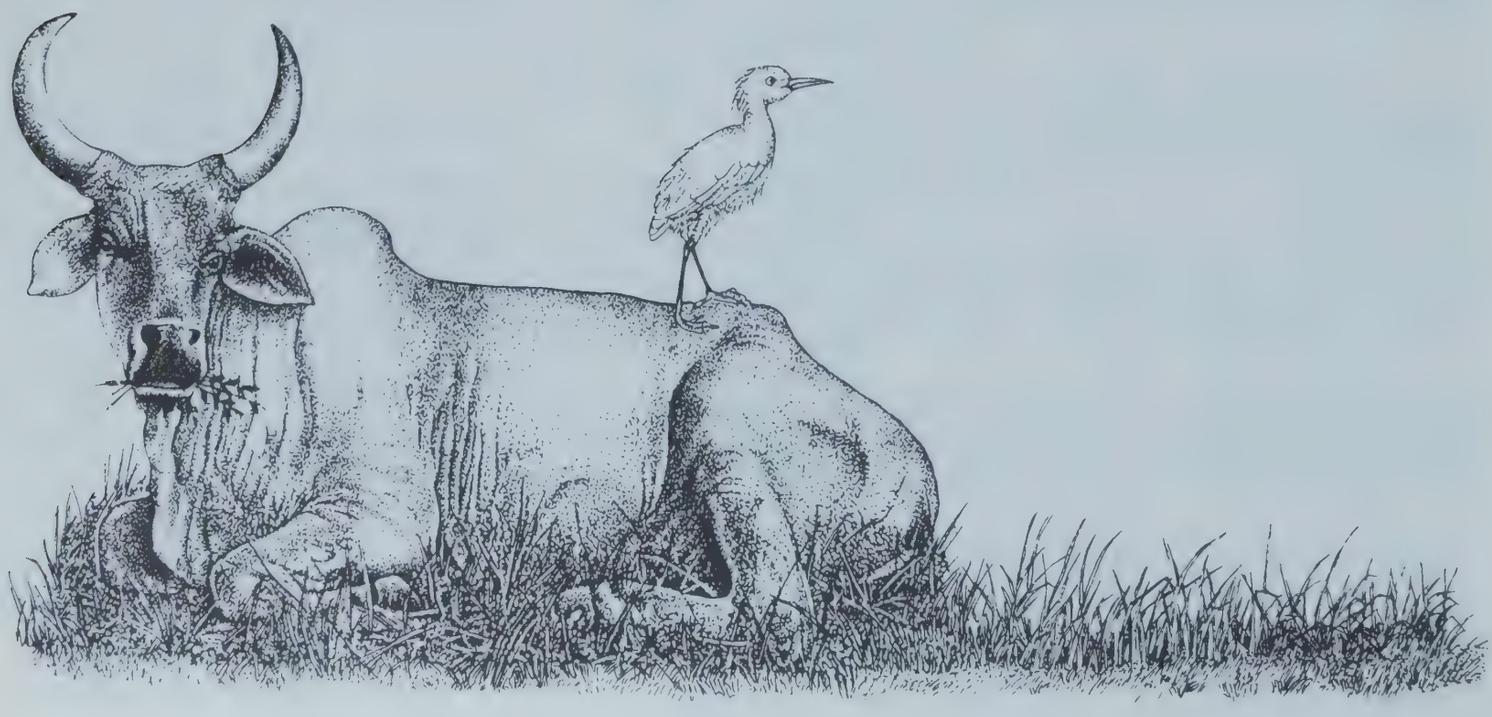
Going on

The feedback on the use of the Floods and Drought package was that the elements were being used as visualized. Based on this, the following year, a package was developed on the theme Conserving Our Water Resources. All the packages are still popular and in demand among educators.

These and later packages developed by CEE have attempted to incorporate feedback from every interaction with teachers and users, and this is a continuing process.


TWO EXTREMES
Floods and drought are two extreme effects of the wide fluctuations of the monsoon. Sometimes in the same state, some areas are affected by floods, while some other areas suffer from drought.

Poster from Floods & Drought package



Adapting for Success: The Making of NatureScope-India

Innovative EE material is being developed in all parts of the world. For those educators who happen to have access to some of these, the temptation to use them for their own programmes is very great. It also makes sense—if something has already been developed that meets the need, why spend time and resources re-inventing the wheel? Most of these materials have gone through a rigorous process of research, development, trials and modifications. Several have proved their success by enduring over a number of years. Such resources are too precious to be put aside. But often one finds that such material, if used outright, are somewhat alien or inappropriate to the context to which they are transposed. Also, most often, copyright problems prevent the use of such material.

At CEE we feel that it is a waste of talent and resources to reinvent the wheel. We feel equally strongly that blindly using material developed elsewhere would defeat our role as innovators. It would also possibly reduce the chances of successful and widespread use of the material.

At CEE we have been exploring the middle path. In discussion with the creators of the material, we have been taking tried and tested EE programmes and material from around the world and adapting these to suit conditions in our country and in our classrooms.

One example of this has been the adaptation of a prize-winning American teacher's environmental education magazine called *NatureScope*. The attempt has been to create an 'Indian', not merely a superficially 'Indianized' series.

We would like to share the process of developing the pilot issue of *NatureScope*, titled Amazing Mammals, and the learnings therefrom.

How it Began

CEE entered into a collaboration with the National Wildlife Federation (NWF), USA, to bring out an Indian version of NWF's prize-winning teacher's EE magazine, *NatureScope*. In fact, the collaboration began with the American *NatureScope* issues using illustrations developed at CEE. It grew with the signing of an agreement between NWF and CEE, whereby CEE was free to use any material from *NatureScope*—directly or in adaptation—for its programmes and publications.

CEE decided that while we would continue to use single activities and information from *NatureScope* to suit specific requirements, we would also attempt to adapt one complete issue of the magazine. This was the conception of CEE's *NatureScope-India*.

NatureScope had, at that time, 15 issues already published. Each issue dealt with a single theme. Themes were diverse, ranging from dinosaurs to deserts, wetlands to weather. CEE decided to choose the issue on mammals for the pilot exercise. The availability of considerable in-house expertise, reference material and ready illustrations in this area pushed the decision in favour of this theme.

What is Adaptation?

The first step involved a thorough review of the original publication with a view to identifying those elements that could be used outright, those that needed some changes in order to be made suitable, and those parts that would need considerable reworking to be useful and relevant.

It is at this stage that the challenges of successful adaptation came to the fore. We quickly realized that the exercise would involve a good deal more than simply replacing the names of animals and places. We realized that the kind of adaptation that we visualized needed a review of several aspects such as the issues under discussion, the examples, the educational methodologies, and the available information base.

The issues under discussion: We had to evaluate how relevant the content and issues were to our target group and our context; and add, substitute, elaborate or drop issues as necessary. For example, any discussion of wildlife protection in the Indian context would be incomplete without talking about issues of displacement of forest-dwelling tribals for the creation of protected areas, and the consequent problems.

The examples: The simple substitution of examples could be partially practicable in the sections which had the background information on, for instance, the basic characteristics of mammals, their life-cycles, their interactions with the habitat, etc. These were basic scientific facts which could be universally applicable.

But we could not, for example, replace kangaroos, koalas and wombats with Indian examples of marsupial mammals. We could however replace dingoes with dholes or Indian wild dogs as examples of male mammals that bring food to their mates and pups, or replace bisons with gaur as examples of wild herbivores. We could also add some typical Indian examples of migrators like the Himalayan black bear; hoarders such as bandicoot rat; or of raising alarm like the chital, to examples already mentioned in the original.

We also found cases where there were no specific examples in the original—perhaps because the issues were already well-publicized by the media, or access to the information was assumed. However, we felt that we needed to specify in all cases. For instance, in the case of species threatened in different ways, we added examples of species affected by habitat destruction, or epidemics wiping out large numbers of species.

The educational methodologies used: The activity approach is the core of the magazine. There was no disagreement with this, since CEE itself also believes that effective environmental education must be hands-on and activity oriented. But the activities as they were written were not all usable in the Indian school situation. How were we to fit these best into the existing classroom situation with all the accompanying constraints of time, facilities, resources, and teacher and student preparedness?

We discovered that activities in *NatureScope* were based on the assumption that the user schools would have access to a number of facilities, including photocopiers and well-equipped libraries.

The CopyCat pages are a characteristic feature of *NatureScope*. These ready-to-copy games, puzzles, colouring pages, worksheets, etc. are meant to be photocopied and handed over to each student.

In a country like India where many schools do not even have desks, chairs and blackboards, to design any activity which pre-supposes availability of other equipment or facilities would be a good way to ensure that the majority of schools would not even attempt to try the activities.

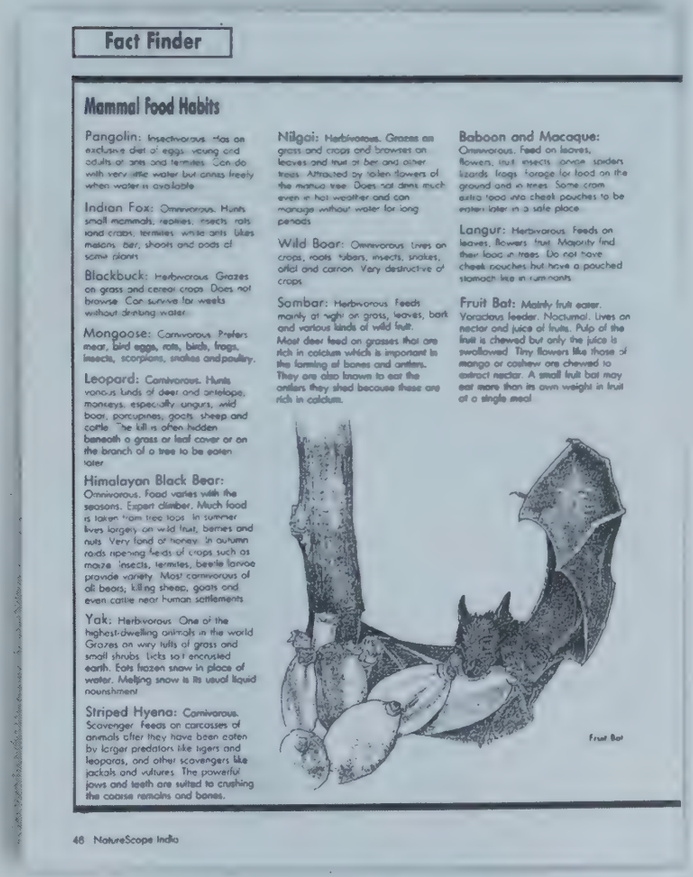
NatureScope-India tackled this situation by falling back upon the age-old teaching-learning method of "chalk-and-talk". Wherever the original activity began by saying "start by handing out a copy of page X to students," *NatureScope-India* urges teachers to start by copying out the relevant pages onto the blackboard or chart paper and displaying this to the entire class. Students then copy out the relevant material onto their notebooks or papers and carry out the activity based on it.

Where the activity says "ask the students to read such and such story", we actually gave the story in the magazine—for a read-aloud session. Where it gave a ready-to-cut outline of a mask, we gave step-by-step illustrated instructions on how to make the mask— for a really 'constructive' craft activity.

Most of the activities in *NatureScope* list copies of the replicable pages and reference books as required material. Most of the activities in *NatureScope-India* do not list more than blackboard, paper and pencil. This is in conscious consideration of the realization which underlines all of CEE's efforts in the area of EE for schools: While the activity approach is an effective one, any activity developed by CEE should not pre-suppose the availability of standard equipment and facilities; rather, it should be possible to adapt the activities to a variety of situations through the use of locally available materials.

The available information base: Many of the activities in *NatureScope* depend on the students collecting information from reference books or libraries. This once again assumes access to such facilities. For *NatureScope-India* we started with the assumption that most students would not have access nor, given the tightly-packed school schedule, the time or inclination to carry out independent research. This, in turn, would be a valid excuse for not initiating the activities at all. So even at the risk of being accused of spoonfeeding, we decided to include as much necessary information as we could to help the teacher undertake the activity in the class. So the Fact Finder pages became a component of *NatureScope-India*.

Thus if an activity requires that students devise imaginative menus for different mammals based on the mammals' food habits and preferences, the Fact Finder gives this information for about 25 mammals— enough to involve a class of 50 students in the activity right away. This does not preclude the possibility of students in schools which have the resources in terms of reference material, facilities and time, finding out for themselves. Even while using the Fact Finders, the activity clearly encourages the teacher to let students do the necessary research.



Fact Finder

Mammal Food Habits

Pangolin: Insectivorous. Has an exclusive diet of eggs, young and adults of ants and termites. Can do with very little water but drinks freely when water is available.

Indian Fox: Omnivorous. Hunts small mammals, reptiles, insects, rats and crabs; termites, white ants (likes masons), berry, shoots and pods of some plants.

Blackbuck: Herbivorous. Grazes on grass and cereal crops. Does not browse. Can survive for weeks without drinking water.

Mongoose: Carnivorous. Prefers meat, bird eggs, rats, birds, frogs, insects, scorpions, snakes and poultry.

Leopard: Carnivorous. Hunts various kinds of deer and antelope, monkeys, especially langurs, wild boar, porcupines, goats, sheep and cattle. The kill is often hidden beneath a grass or leaf cover or on the branch of a tree to be eaten later.

Himalayan Black Bear: Omnivorous. Food varies with the seasons. Expert climber. Much food is taken from tree tops. In summer lives largely on wild fruit, berries and nuts. Very fond of honey. In autumn raids ripening fields of crops such as maize. Insects, termites, beetle larvae provide variety. Most carnivorous of all bears, killing sheep, goats and even cattle near human settlements.

Yak: Herbivorous. One of the highest-dwelling animals in the world. Grazes on wiry tufts of grass and small shrubs. Licks salt encrusted earth. Eats frozen snow in place of water. Melting snow is its usual liquid nourishment.

Striped Hyena: Carnivorous. Scavenger. Feeds on carcasses of animals after they have been eaten by larger predators like tigers and leopards, and other scavengers like jackals and vultures. The powerful jaws and teeth are suited to crushing the coarse remains and bones.

Nilgai: Herbivorous. Grazes on grass and crops and browses on leaves and fruit of ber and other trees. Attracted by fallen flowers of the mahua tree. Does not drink much even in hot weather and can manage without water for long periods.

Wild Boar: Omnivorous. Lives on crops, roots, tubers, insects, snakes, offal and carrion. Very destructive of crops.

Sambar: Herbivorous. Feeds mainly at night on grass, leaves, bark and various kinds of wild fruit. Most deer feed on grasses that are rich in calcium which is important in the forming of bones and antlers. They are also known to eat the antlers they shed because these are rich in calcium.

Baboon and Macaque: Omnivorous. Feed on leaves, flowers, fruit, insects, grubs, spiders, lizards, frogs, forage for food on the ground and in trees. Some cram extra food into cheek pouches to be eaten later in a safe place.

Langur: Herbivorous. Feeds on leaves, flowers, fruit. Majority find their food in trees. Do not have cheek pouches but have a pouched stomach like in ruminants.

Fruit Bat: Mainly fruit eater. Voracious feeder. Nocturnal. Lives on nectar and juice of fruits. Pulp of the fruit is chewed but only the juice is swallowed. Tiny flowers like those of mango or cashew are chewed to extract nectar. A small fruit bat may eat more than its own weight in fruit at a single meal.

Fruit Bat

48 NatureScope India

Page from *NatureScope-India*

The sound and the look of it: We also realized that the presentation style we would have to use, in order for teachers in India to feel quite comfortable with the publication, was considerably different from the original. The change could be seemingly small, like changing 'Without a good nose, many mammals would have a difficult time..' to read, 'Without a good sense of smell, many mammals would have a difficult time ..', or substituting 'students' for 'kids'; but each change was made consciously to make the text more comprehensible to the teachers.

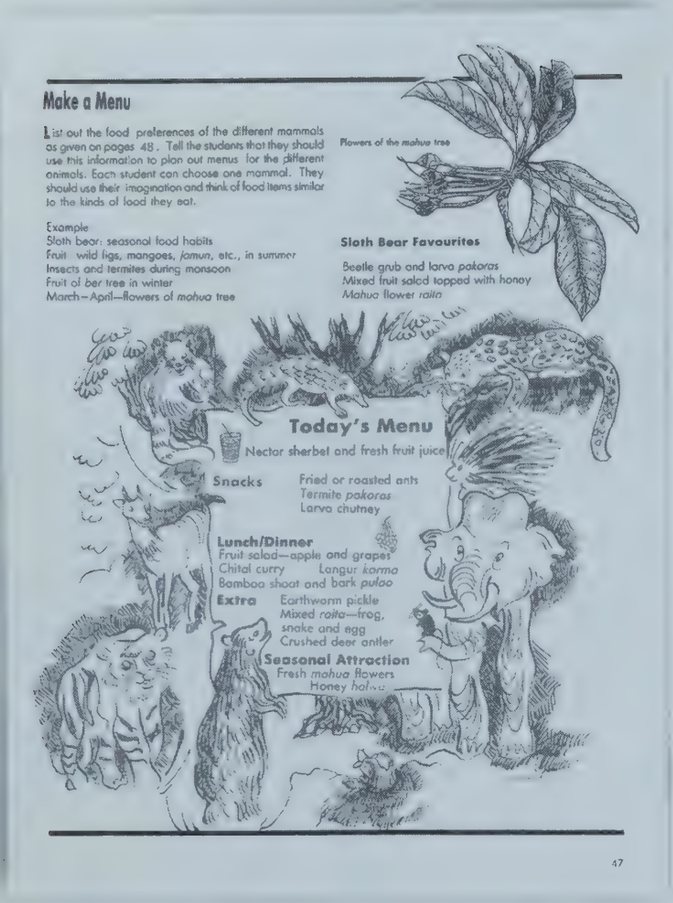
We felt we could not be too chatty but needed to go step-by-step, using short paragraphs for every point, and giving clear instructions.

Since a lot of the information in *NatureScope India* is addressed directly to the students, there was also the tricky job of converting 'high science' into a language and format that a 10-year old could understand, without distorting the facts.

Even when designing the look of the book, some of the considerations discussed with respect to content came into play.

We wanted *NatureScope-India* to have a distinct appearance—something that would be the identifying feature of the entire series. This meant that the layout designer too should understand the process and philosophy that lay behind the experiment in adaptation. So the designer became part of the development team from the start. Together we discussed activities, ideas and content, while planning design.

Since there was a paucity of visual material in schools, we tried to illustrate profusely the publication with high quality visuals. Most important, we wanted a product that was so attractive that even the most reluctant teacher would be tempted to pick it up and leaf through it. It had to look different from anything that usually enters the school. We specially felt it necessary to


Make a Menu
List out the food preferences of the different mammals as given on pages 48 . Tell the students that they should use this information to plan out menus for the different animals. Each student can choose one mammal. They should use their imagination and think of food items similar to the kinds of food they eat.
Example
Sloth bear: seasonal food habits
Fruit wild figs, mangoes, jamun, etc., in summer
Insects and termites during monsoon
Fruit of ber tree in winter
March–April—flowers of mahua tree
Flowers of the mahua tree
Sloth Bear Favourites
Beetle grub and larva pakoras
Mixed fruit salad topped with honey
Mahua flower raita
Today's Menu
Nectar sherbet and fresh fruit juice
Snacks
Fried or roasted ants
Termite pakoras
Larva chutney
Lunch/Dinner
Fruit salad—apple and grapes
Chital curry
Langur korma
Bamboo shoot and bark pulao
Extra
Earthworm pickle
Mixed raita—frog, snake and egg
Crushed deer antler
Seasonal Attraction
Fresh mahua flowers
Honey
47

Page from *NatureScope-India*

challenge the subconscious feeling that anything that is attractive cannot be really 'educational'. We wanted to reinforce that education can be fun and look good.

When *NatureScope India's Amazing Mammals* finally came together, we were amazed at how much information we had managed to pack in. This was information that would be difficult to come by in a single reference book or from a single source. We had thus put together more than a single issue of a magazine. We had compiled considerable information, on a single theme, that could be used in a number of different teaching-learning situations.

Thus our adaptation exercise went far beyond the original scope, into an area which also attempted to supply basic reference material to schools with a paucity of resources.

Creating *NatureScope India* revealed the many facets of adaptation. The nature and degree of adaptation depend a great deal on the nature of the issue being dealt with. In cases where the content deals with basic scientific concepts, the adaptation required may be minimal, consisting mainly of substituting names of species and geographical locations, and modifying teaching methodology to take care of local conditions. Where habitats are the key issues, a greater degree of adaptation is called for—for example, any discussion of mountains in the Indian context would need to take into account the special geological features of the Himalayan range. Where man-nature relationships are the central concern, the adaptation exercise may in fact turn out to be a re-development, within the original format, because social, economic, political and cultural realities which affect the relationship are bound to be different in different parts of the world.

We learnt that adaptation involves putting the issue under discussion in the relevant environmental and educational context; finding ways in which the material can retain its excitement and validity, but still work within the constraints of the local educational system; finding ways in which the creative aspects of the material are not lost, but find expression in local forms. Thus successful adaptation involves a variety of inputs, including a fair amount of imagination and creativity.

We hope that the process doesn't end here. The true success of adaptation will be when a teacher in Ladakh or an Eco-club leader in Lakshadweep has the confidence and excitement to modify and use *NatureScope India* according to his/her specific needs.

Adaptation of EE Material
A Resource-Efficient Approach

Background

When CEE initiated its North-Eastern Regional Cell in Guwahati in October 1993, it already had some experience of school-level EE programmes in this region. This was through involvement with teacher training and school EE programmes under the National Environmental Awareness Campaign (NEAC) of the Ministry of Environment and Forests (MOEF) since 1986.

Through this long experience, and work in the seven states subsequent to the establishment of the Cell, it became increasingly clear that while there were a number of EE initiatives by both government institutions and NGOs, one major gap was the availability of EE material in the local languages, developed for the local context.

In order to fill this gap, CEE felt it was a priority to develop some standard, sample EE material for teachers and students in the North-East.

After discussions within CEE, it was felt that the approach to be taken was not to spend time and money to develop and try out new material. Rather, the approach would be to build on the more than five years of doing EE programmes in the region and of the experience of using some of CEE material in the region.

It was felt that the aim should be to develop certain model material for the North-East. Towards this, it was decided that some of CEE's existing publications would be adapted and brought out for use in some of the North-Eastern states.

Selecting the Publications

CEE has a wide range of publications for teachers and children. It was decided to choose the following three publications:

Joy of Learning: The first of CEE's publications for schools, this book had already been tried extensively in the North-East, as well as in other parts of the country. It suggests a menu of 75 sample activities that can be undertaken by teachers with students. (See page 12).

Approaches to Environmental Education: Some Working Papers: This book, meant for teachers, aims to explain the use of certain active approaches to teaching-learning environmental concepts, e.g. games, experiencing nature, etc. It provides a background to help teachers to develop and use such active methods.

Bird Observation Book: This is a bird book for children, developed as a part of CEE's Sariska School EE programme. It not only describes 45 commonly seen birds, but, using a workbook format, helps children observe these in a systematic way. It has a wide range of possible uses—through schools, eco-clubs, nature camps, youth groups and by individual children.

It was felt that these three publications would form a good, basic package. It was decided that they would be brought out in Assamese, Khasi and Mizo, for use in Assam, Meghalaya and Mizoram respectively.

Based on this, a proposal was developed and submitted for consideration under the Environmental Orientation to School Education (EOSE) scheme of the Ministry of Human Resource Development. The Ministry considered the proposal and granted its approval for an 18-month project.

The Process

As the first step towards the adaptation of these publications, a workshop was organized at Guwahati. NGOs involved in nature-related activities, academics, people from the Education Departments of the States, as well as experts, were involved in this three-day workshop. These participants were from the States for which the adaptations were to be done.

The schedule of the workshop was as follows:

First Morning: Introduction to the project; discussion of the workshop scope and objectives; familiarization with the three publications.

First Afternoon: Presentation and discussion of some issues in adaptation of EE programmes and material; breakup into Statewise working groups, and review of the publications.

Second Morning: Work in state groups to review *Joy of Learning* in detail and make a listing of all changes required.

Second Afternoon: Work in state groups to review *Approaches to EE* in detail and make a listing of changes.

Third morning: Review of the bird book format in plenary.

Review of birds to be dropped/added for each state in state groups.

Third Afternoon: Plenary meeting to discuss the subsequent processes in the project; identification of possible translators; setting up of deadlines; feedback.

At the end of the workshop, three versions each of the original three documents were ready—reviewed and marked in detail as to the changes that needed to be carried out.

What were the kind of changes that were suggested

a) Addition of examples from the specific environment: For example, in an activity regarding measuring the height of trees, specific trees likely to be easily seen in each state would be mentioned in that version.

b) Mentioning specific areas/facilities: In a chapter regarding camping, it was felt that details of camp sites in each state and NGOs involved in camping in that state should be mentioned. In other cases, specific places where a phenomenon or features could be observed were mentioned; for example, specific wetland areas, protected areas, etc.

c) Changing visuals: In many instances, participants felt that photographs/illustrations should be changed to give a feeling and flavour of the specific environment. For example, several flora and fauna species in the original which represented species from arid or semiarid areas needed to be replaced with species seen in the specific states.

d) Substituting: In the Bird Observation Book, the species which were not seen in the particular state were replaced by species from the same family commonly seen in the state.

After the workshop

The manuscripts were not ready to go for translation yet. What had been done through the workshop was the identification of areas needing change, additional information to be added etc. Doing this research and making these changes was the responsibility of the CEE team, which contacted various agencies in the individual states to get the necessary information and inputs. For instance, each of the state groups suggested that a listing of all camping areas in that state be given as an appendix to the chapter on camping in *Approaches to Environmental Education.*

The work required was greatest for the Bird Books, where different birds had to dropped for different states and certain others added in each case. This was done with the help of bird watchers and experts.

Once all this research was done, the text was ready to go for translation. CEE, based on the suggested translators' list drawn up at the workshop, contracted out these translations.

Once the first translated draft was ready, it was sent to reviewers for comments. The drafts with comments went back to the translators.

In the meantime, based on the suggestions at the workshop, CEE had drawn up a list of photographs and illustrations required. The photographs were mainly action shots involving children and teachers doing activities. The illustrations were mainly wildlife—animals, birds, trees etc. With a view to making each edition not only content-wise and language-wise appropriate for the state, but also in terms of the visuals, this list was rather long.

The list of illustrations was sent to CEE Ahmedabad where the Studio culled out those illustrations which were already in the large Illustration Bank developed by CEE over the years. Work began on developing those which were not there. For the photographs, a CEE team visited each of the states and took the photographs.

After this, a person from the CEE Studio at Ahmedabad went to Guwahati to work on the design and production of the books. No changes were made to the design of the English books. With the help of an artist from a local NGO, the layout and production were completed.

The books have been disseminated and are in wide use in all the three states.

Factors Contributing to Success

The three-day workshop conducted at the start of the project contributed to its successful implementation in several ways. It brought together the key partners (NGOs, government departments, experts, academic institutions) and generated widespread support for the project.

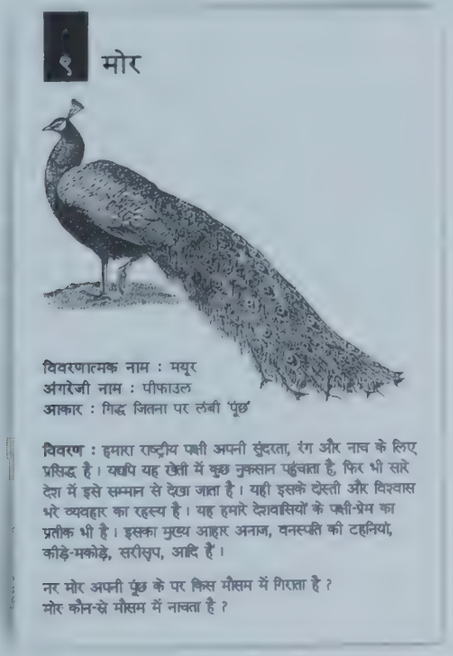
The workshop ensured that the adaptation process was fully participatory. It was left to each state team to decide the adaptations required in each book for their state. The CEE team facilitated the process and undertook the research and adaptation after the workshop.

By bringing in academics and researchers into the workshop, it was possible to have the content-related questions answered 'on-line'—e.g. what would be the best example of fruiting trees which attract birds in a particular state.

The participation of NGOs helped to get inputs on locale-specific issues. For example, because of their participation, a note on the threats to the White Winged Wood Duck in the region was developed for the Bird Book.

The informal atmosphere of the workshop also facilitated inputs from unexpected quarters. For instance, the driver accompanying the team from Meghalaya was able to give valuable inputs on the local names and distribution of several bird species.

Through the generous contribution of participants at the workshop, what might have taken weeks was done in three days. Even following the workshop, NGOs, institutions and experts gave generously of their time and knowledge. It was this sharing of knowledge which helped the project.

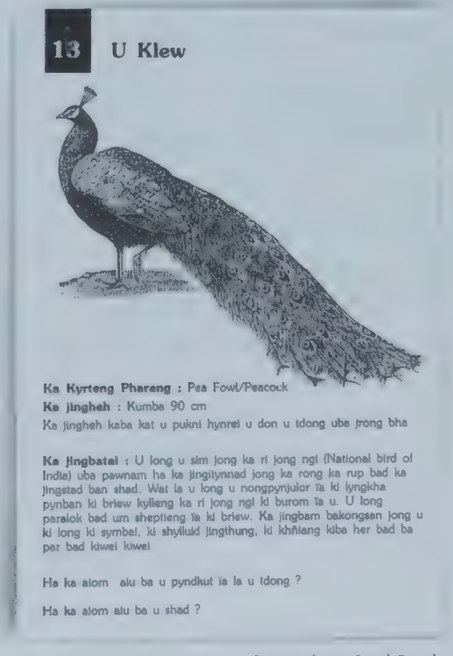

९ मोर

विवरणात्मक नाम : मयूर
अंगरेजी नाम : पीफाउल
आकार : गिद्ध जितना पर लंबी 'पूंछ'

विवरण : हमारा राष्ट्रीय पक्षी अपनी सुंदरता, रंग और नाच के लिए प्रसिद्ध है। यद्यपि यह खेती में कुछ नुकसान पहुंचाता है, फिर भी सारे देश में इसे सम्मान से देखा जाता है। यही इसके दोस्ती और विश्वास भरे व्यवहार का रहस्य है। यह हमारे देशवासियों के पक्षी-प्रेम का प्रतीक भी है। इसका मुख्य आहार अनाज, वनस्पति की टहनियां, कीड़े-मकोड़े, सरीसृप, आदि हैं।

नर मोर अपनी पूंछ के पर किस मौसम में गिराता है ?
मोर कौन-से मौसम में नाचता है ?

Page from Hindi Bird Book


13 U Klew

Ka Kyrteng Pharang : Pea Fowl/Peacock
Ka jingheh : Kumba 90 cm
Ka jingheh kaba kat u pukni hynrei u don u tdong uba jrong bha

Ka Jingbatei : U long u sim jong ka ri jong ngi (National bird of India) uba pawnam ha ka jingiynnad jong ka rong ka rup bad ka jingstad ban shad. Wat la u long u nongpynjulor ïa ki lyngkha pynban ki briew kylleng ka ri jong ngi ki burom ïa u. U long paralok bad um sheptieng ïa ki briew. Ka jingbam bakongsan jong u ki long ki symbai, ki shylliud jingthung, ki khñiang kiba her bad ba par bad kiwei kiwei

Ha ka alom aiu ba u pyndkut ïa la u tdong ?

Ha ka alom aiu ba u shad ?

Page from Khasi Bird Book

Pakshi Nirikshan Pustika becomes *Dosti Karu Ya Pakshyanshi*

Bird watching is a popular activity in Maharashtra. While there are several bird books in English and Marathi, there is no Marathi book on the common birds of Maharashtra, written in a simple style for children, with good illustrations, encouraging them to observe birds and highlighting the place of birds in nature.

The Pakshi-Mitra Sammelan and the several individuals and organizations associated with it, are a network involved in creating environmental awareness through bird watching. To support this effort, CEE Central Regional Cell took up a project to develop an ecology-oriented bird observation book for children with the *Pakshi Nirikshan Pustika* developed by CEE as part of the Sariska Environment Education Project as the basis.

The actual adaptation and reworking of the format, text and illustrations is a process requiring a fair amount of skill and knowledge, which perhaps no one individual possesses. A variety of inputs were thus required even to define the scope of the adaptation. These inputs were obtained through a two-day workshop. The framework evolved for the Marathi book through this process:

1. The species in the book need to be those that are common in Maharashtra.
2. The area covered by the Hindi book was a specific kind of habitat. To develop a book to be used throughout Maharashtra, it would need to have some indication of which bird is most likely to be found in which habitat.
3. A section on habitats needs to be included if a variety of habitats are being covered.
4. The original was a workbook format, with space for recording observations. It was felt that this could be somewhat modified, with the headings under which observations could be written being given in a few sample workbook pages at the end of the book. A write-up could be included on how to record observations, with suggestions for notes and quick sketches. A section on different styles of bird illustrations could also be included.
5. A map giving good birding sites in Maharashtra could be included.
6. A write-up on rare and endangered birds in Maharashtra and information on where sightings can be reported (such as the BNHS or the Bird Watching Society of Andhra Pradesh), could be included.
7. Local bird names vary across the state, and these need to be included in addition to the common Marathi, English and scientific names, with the pronunciations written in Devnagri.
8. Information on reference books and organizations involved in related activities.

Following this workshop, the task of reworking the text began with a straight translation of the Hindi text to Marathi. This was done by a person who has experience of writing for children. The translated text was then handed over to an experienced bird watcher and nature educator, for looking over the text from a technical angle.

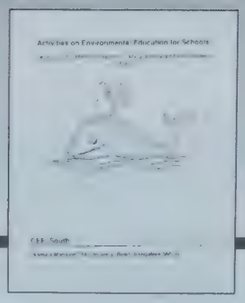
Once this was ready, it was presented to the group that had met earlier. At this meeting it was decided to provide interesting information and snippets regarding birds, which would prompt readers to look out for these details in the field. It was also felt that many new illustrations were needed to enliven the book.

After this was done, the draft was presented at the annual Pakshi Mitra Sammelan to get inputs from a large cross section of bird watchers from across the state. Comments received related mainly to local bird names, the sequencing of the birds, etc.

Next, the 'almost final' version was read out page by page, at a two-day meeting of bird watching groups from different parts of the state. The author of the original Hindi book was also present. At this meeting, thought was also given to dissemination of the book. The final comments are being incorporated and the book should be ready soon.

The process of translation and adaptation has thus looked at defining the scope of the book, in the light of the environmental education work and the bird-related books and materials already available in the state. The adaptation process was enriched because of the variety of inputs from several resource persons. The sensitivity in reworking the text, towards both bird watching and writing for children in Marathi, is perhaps the most crucial factor in the development of the book.

A Participatory Approach to the Development of EE Programmes and Material



Experiences of the Environmental Education Bank (EE Bank)

Even when CEE initiated its School Programmes in 1984, it recognized that for a country of the size and diversity of India, it was neither possible nor desirable to have merely one or two agencies developing EE material and disseminating them to users across the country. How can one bird chart cater to a country whose area is 3,287,263 sq km? Can and should the same set of monitoring activities be used in schools which have labs, and schools which do not even have running water? Can the same water conservation programme be proposed for schools on coasts, and for schools in the desert?

In a situation where there are great diversities in terms of ecological conditions, environmental problems, educational situations, etc., the development of EE programmes and material is specially challenging. The diversities may range from:

- Schools with computers and the latest audio-visual aids, to schools with no blackboards;
- Schools in large urban areas, to schools in rural hamlets;
- Schools across 10 bio-geographical zones;
- Schools with one teacher handling four classes (approximately 120 students) at a time, to schools where the student-teacher ratio may be 20:1.

It is indeed difficult to develop material and programmes in a centralized manner in such a situation. There has to be some way in which a concerned educator, school, NGO or state agency can put together its own EE programmes and material, keeping in mind its specific local situation, priorities, and concerns. Only then would the EE programme be really relevant to the students, and only then would teachers be really motivated to want to teach it.

But how can this be done? Teachers have their hands full with teaching. They have neither the time nor resources, nor in fact the training, to develop programmes and material. NGOs have a deep understanding of local environmental issues, but may not have either the expertise or experience to develop an educational programme. Government institutions may have the expertise but not the capacity to respond, and respond quickly, to a variety of demands coming in from various agencies.

CEE's response to this challenge was the development of the EE Bank. This was conceived as a facility and process to support the de-centralized and participatory development of EE programmes and material.

The development of the EE Bank was supported by IDRC, Canada. The Bank helps CEE fulfil its function as the node for EE as part of the ENVIS data base of the Ministry of Environment and Forests, Government of India.

What is the EE Bank?

The EE Bank is both a facility and a process.

The facility is made up of two components:

a) A computerized data base which consists of the following:
   - a collection of concepts (approximately 700 to-date);
   - teaching activities with details of procedures (approximately 3000);
   - case studies related to environmental initiatives, problems etc., which can be used as examples;
   - case studies describing how institutions and individuals have carried out EE programmes (approximately 100);
   - access information to EE resources like books, magazines, audio-visuals, resource persons and organizations.

b) The second component includes physical resources like resource directories, activity manuals, EE kits, games, posters, etc.

The Process

The process consists of a workshop through which a group of educators along with CEE facilitators discuss, brainstorm and research to put together an educational package in a space of five days or less.

How is the Process Structured?

The process first exposes the participants to a variety of approaches to EE through actual experiences. For example, participants go on a nature trail; they play games; go through a role play, etc. After each of these experiences, there is a discussion on the strengths, weaknesses, and relevance of the approach. Participants' own experiences in using the approach are also discussed. This way, each participant develops a confidence to use the method and an insight into when and how it can be used.

After this, participants individually articulate what their EE needs are: one group might want to develop a year-long programme for an eco-club; another to develop a one-term programme on pollution; yet another a series of posters on local medicinal plants. Through facilitated group discussions, each participant refines her/his requirement and examines her/his situation, constraints and opportunities.

The third step is for the participants to go through the resources of the EE Bank. They look up tried and tested material and activities developed around the world, which address issues and situations similar to their own. Sometimes they come across ideas that they can directly use. At other times, there may be programmes/activities that can be used with some adaptation/ modification. Even if they are not able to get directly usable blueprints, they get a large number of new, innovative ideas which are the starting point for developing of their own activities.

The fourth and last step is the development, in groups, of individualized packages tailor-made for their own situations. This process is facilitated by CEE personnel who are experienced in developing EE material. There is constant peer review through presentations and discussions. Where necessary, content experts are brought in to give their inputs.

This process has been found very useful in generating a usable EE package in a way that is resource- and time-efficient. Because the group is exposed in a short time to a variety of similar programmes developed elsewhere, there is no

A typical five day workshop schedule is given below:

Day I : Introductions

Ice Breaker Games

What is EE? (Discussion)

Approaches to EE (Games, creative writing, nature trails, outdoor experiences, drama, activities).

Day II : Approaches to EE (Exhibitions, Role Play, Demonstrations, Environmental quality monitoring, Use of audio-visual media. Discussions and hands-on)

Day III : Discussion about participants' requirements of EE programmes and materials; their situation; constraints and opportunities.

Brainstorming on approaches to an EE programme for individual participants; grouping, based on common requirements.

Exposure to the EE Bank.

Group work (facilitated by CEE staff) to finalize outline of EE programmes and materials.

Day IV : Presentation and discussion of group work. Work continues in groups to detail out the programmes, using the resources of the EE Bank, both the computerized Bank and the physical resources.

Presentations and discussions.

Day V : Group work and use of EE Bank continues. Finalization of packages.

Presentations and discussion.

"reinvention of the wheel", and avoidable mistakes are, in fact, avoided. The constant inputs of experienced facilitators also assists this process.

What are the Strengths of the Process?

It is a way to develop programmes and material which cater to felt needs. Therefore the chances of the programmes and material being used are high. The programmes are developed by the stakeholders themselves: from the articulation of the need, to deciding what format the programmes should take—all are decided by the participants. The programmes and material are developed within the framework of constraints that exist, and therefore the likelihood that the programme can be implemented is greater.

The external resource persons facilitate the process and offer suggestions. At the same time, inputs from experienced resource persons on content and methodology are a part of the process.

The process cuts down on the time and resources required for such a development, by starting from a base of tried and tested programmes.The process has a certain level of inbuilt quality checks: these include the fact that the starting point is usually material and activities which have been tried and tested; peer reviews and facilitator comments and guidance.

What Does the Process Result In?

The process results in a usable 'product'. This may be in the form of a draft manual of activities; a script for a radio programme or slide show; a calendar of activities for an eco-club; a set of posters, etc. Whatever the product is, it is in a form that is almost directly and immediately usable by the participant. Because each participant is also the author of the product, the stake in ensuring that the programme is in fact implemented is high.

Also, since the participants have been a part of the process of development of the product, they are conversant with, and confident of, the product and its use. Since they know the rationale behind the programme/material, they are also in a position to make changes as and when required. Most important, since they have gone through a process of developing their own innovative teaching-learning programme, they are in a position to do this again in future, with other topics, issues and subjects.

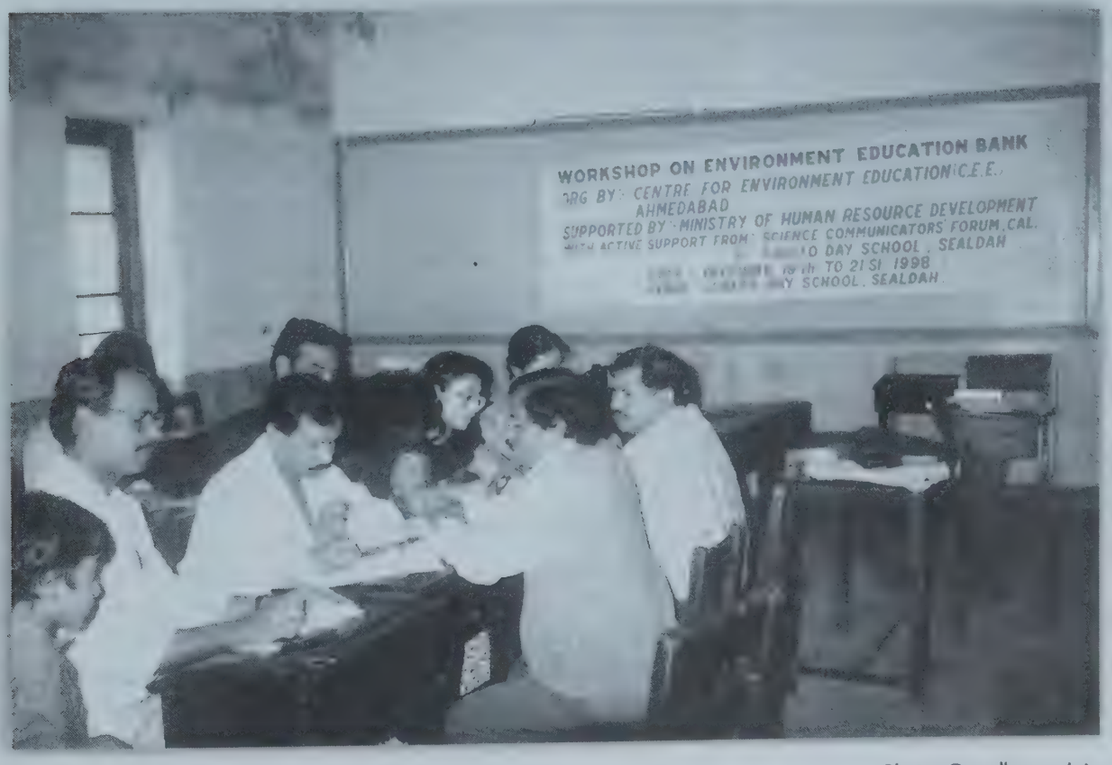


Photo: Gopalkumar Jain

Some Experiences

The EE Bank data base and workshops are available through five of CEE's offices: at Ahmedabad, Bangalore, Guwahati, Pune, and Tirupur. At each of these locations, the Bank has been used to develop a variety of programmes and material for different media and target groups. A few such innovatives experiences are described in the following pages.

Merging the Performing Arts and EE

An Ahmedabad-based group Darpana for Development, associated with the well-known school of performing arts Darpana, approached the EE Bank with an unusual request. They had been asked to carry out awareness programmes in schools on key environmental themes. The idea was that they would use performing arts to arouse interest and then support this with other activities, and they wanted some help in this. In response to this a five-day workshop was organized. The participants were a team of five artists from Darpana (script writer, dancers and actors), and the Educational Coordinator of the project.

This team worked with the CEE facilitators over the five-day period. The first step was to gain an understanding of EE and also of the realities of the school system with which not all of them were familiar.

Following this, it was decided to work on three themes—water, energy and garbage—for the year. The CEE team scanned the EE Bank and culled out basic concepts relevant to these themes. These were then discussed with the participants. This took some time because at this time the performing arts team was not fully conversant with the scientific concepts or issues.

This was followed by a brainstorming to decide on the list of the important messages for each theme. The performing arts team then mulled over these and developed script outlines for a dramatic piece on each theme. These were described to the CEE team which gave its comments from the point of view of the content.

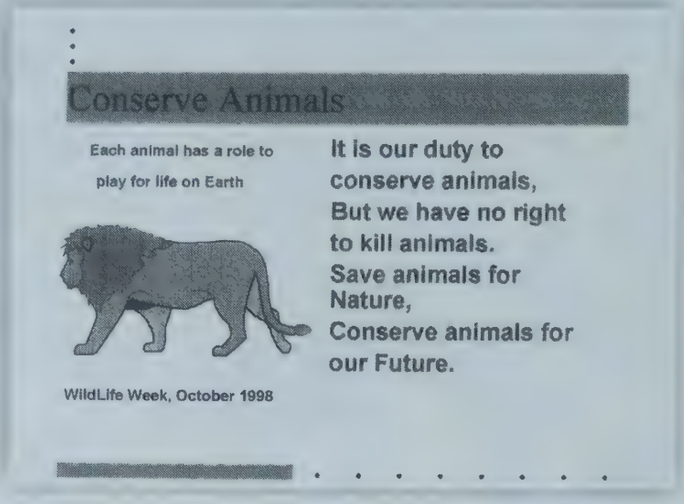
Based on this, the team worked out a dramatic piece on the theme. The next task was to plan a series of weekly classroom follow-up activities. This was done by using some of the activities from the Bank. Each one was discussed with the participants. Some were demonstrated and carried out. After this, a final list of activities was drawn up.

This programme has been successfully implemented in several schools of Ahmedabad. In this case the EE Bank provided inputs from the content and educational angle. The task of developing the creative art form—the play, script, direction, etc. was mainly the responsibility of the Darpana team. It was a successful synergy where two teams with different strengths could come together to develop an exciting programme.

Children in Charge!

An interesting use of the EE Bank was at Tirupur in Tamil Nadu. It was an experiment of getting children to use the EE Bank. A joint workshop was organised for students and teachers wherein five students (President, Vice-president, Secretary and two junior students) of the eco-club of each of the associated schools came with their eco-club teacher for this three-day workshop. Apart from other activities, an important part of the workshop was using the EE Bank to choose the activities that the students wanted to do in the coming year in their eco-clubs. This concept received an enthusiastic response from the teachers as well as the students.

On the one hand the teachers felt that their burden on deciding what kind of activities they should do with the children, whether the activities would be of interest to the children, etc. had, to a great extent, been lessened. With the children getting a chance to choose their own activities, they were


Conserve Animals
Each animal has a role to play for life on Earth
It is our duty to conserve animals,
But we have no right to kill animals.
Save animals for Nature,
Conserve animals for our Future.
WildLife Week, October 1998

Card designed by Tirupur students

able to choose activities which interested them. Getting them to keep in mind that they were to choose activities which not only appealed to them, but also would, to the other eco-club members saw them choosing the activities with more care and

responsibility. Most schools had chosen three topics—one for each term—through a discussion in the class with all the students participating. Solid Waste Management, Water, and Forests were the topics chosen (not necessarily in that order of priority) by most of the schools. They all chose very different activities related to these topics,from the EE Bank.

While one school used the computerized EE Bank, other schools took turns at going through the physical resources. Kits, books, videos and craft ideas were used by the students and the teachers to plan their activities for the eco-club in school, as well as to learn new skills such as collage and clay modelling. On the final day, the students and teachers of each school were asked to prepare some educational activity on the topic of their choice to feed into the Bank.

A range of interesting activities and communication material was designed by the groups. Some of these are:

- A Powerpoint presentation on Pollution which the children use to give a talk in their own class and in other classes;
- A set of cards with wildlife protection messages which were used during the World Wildlife Week;
- A Picture Poem on "Forests";
- Scripts of four plays;
- Five poems and innumerable paintings on themes like 'Tirupur of my dreams', 'My river Noyyal' and other issues related to Tirupur and this district.

Government teachers, being very well qualified, were able to comprehend the concept. Many of them come in to use the Bank on and off. But so far, they have used it more for taking out rather than putting in activities. Rural children have not used the EE Bank. In the rural schools, there is a strongly felt need for the Bank to be available in the local language.

A number of literacy volunteers from the District Literacy Mission have also been using the Bank for activities and experiments which they can use in their non-formal education in the villages.

Developing Subject- and Level-Specific Programmes

Science, as taught at school level, sometimes unfortunately gets reduced only to disseminating information on various topics. The stress on the process of learning by doing is often forgotten, and stress is laid more on just recollection of information.

An EE Bank workshop was held in an attempt to help teachers give an activity-oriented approach to science teaching. Twelve primary school teachers from various parts of Gujarat participated in the programme titled "An Environmental Perspective for Class VI Science Curriculum of Gujarat Board".

During the first two days of the workshop, participants were introduced to various approaches to active teaching and learning. These included Games, Camping, Nature Trail, Nature Observation, Creative Writing, Drama, Exhibitions, Live Animals, Action Projects, etc.

There were sessions for introducing the teachers to the skill of making models that could be used to teach science, using material that are generally considered as waste. They were also introduced to origami, the art of making models and shapes through paper folding.

As this workshop pertained specifically to Standard VI Science Textbook of the Gujarat State Board, 80 activities corresponding to the content of the textbook were pre-selected from the EE Bank's computerized database. As the participants were from the rural areas where material resources available are few, care was taken to ensure that the facilities needed for carrying out the selected activities were minimal.

These write-ups were translated into Gujarati, and were shared with the participants. Working in sub-groups, they then selected and adapted these to their specific situations.

Through this process, by the end of the fifth day, the participants could carry back a set of 30 to 50 activities, ideas and experiences on methods of active teaching with regard to their science curriculum.

Developing Video Programmes

The EE Bank has also been used to facilitate educators in the process of material development for video programmes. A five-day workshop was organized by CEE South, Bangalore, for NGOs and individuals who are involved in development of EE material using video as the medium.

The first three days of the workshop were devoted to introducing video as a medium of communication and for a general introduction to environmental concepts and effective EE teaching methods. The participants discussed and compared the pros and cons of the video medium over conventional methods. Visits to Doordarshan Kendra, Bangalore and to a video studio was organized so as to expose participants to the technologies as well as the techniques involved in developing, producing and editing video programmes.

For the last two days, the participants were divided into two groups, and they developed video scripts on environment related issues. They used the computerized data base for clarity and specificity in concepts, and for getting ideas on how to present these in an interesting way. The physical resources also served as a source for reference.

By the end of the fifth day, the participants came out with two one-minute, and two five-minute scripts on Biodiversity of India, and issues related to Water, for a general audience.

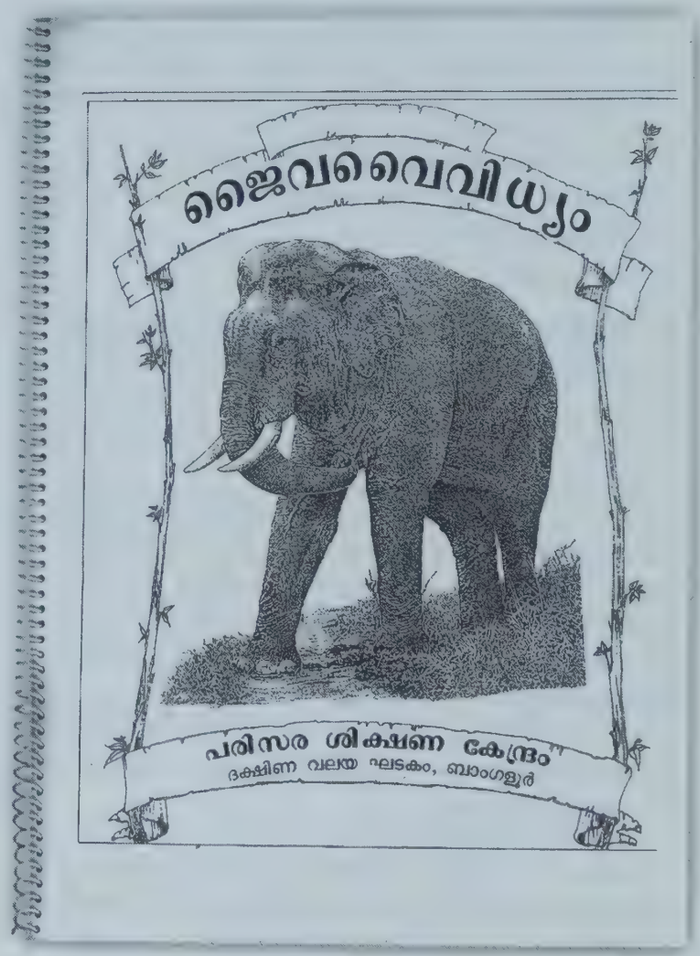
Developing Material for School Clusters

To fulfil CEE's objective of capacity building teachers in various parts of India and helping them plan and organize school environmental education programmes, CEE uses the cluster approach. A group of 20 to 25 schools within a geographically contiguous area is linked to an NGO to form a cluster. Each cluster acts as a unit which plans and organizes school-related activities, including teacher training, etc.

CEE South, Bangalore organized an EE Bank workshop on Natural Resources for the NGOs of clusters of the States of Andhra Pradesh, Tamil Nadu, Kerala, and Goa to develop locale-specific EE material in local languages, for use in the year-long cluster programmes of their school.

The first two days of the programme were devoted to plenary sessions to help participants to understand various concepts in sustainable management of natural resources. Also, the participants were helped to experience various active approaches to teaching and learning like role play, games, field trips, etc. Methods of studying natural resources, and conservation efforts were discussed in-depth.

For the next three days, the participants were divided into five state-wise groups, with each group taking up material development in their own local language. The EE Bank's computerized data base and the physical resources which include charts, kits, booklets etc. were used extensively.



Manual developed by Kerala teachers

The participants from Andhra Pradesh clusters picked out activities on water from the computerized database, adapted them to suit their local situation and translated the material into Telugu. The material developed includes 12 activities, among which is a 'Water Puzzle' and an activity called 'Become an Advocate' to help students understand different aspects and issues related to water, in the Andhra Pradesh context.

The participants from the Goa cluster drew ideas and activities related to coastal ecosystems suitable for use at the middle and high school levels from the computerized database. They then adapted these to their local situation. The activity booklet developed by them in English contains 14 activities with background information for teachers in Goa. The booklet focuses on the coastal ecosystem, mangroves in particular, and the problems of pollution on beaches.

The participants from the Karnataka cluster chose from the computerized database concepts and activities on water pollution, and adaptations of fauna to live in water. The booklet developed by them in Kannada covers various concepts related to water, its quality and usage in the region. These were then presented in the form of activities. One section of the booklet covers information on water insects and their adaptations, and water pollution, using puppetry and drama.

The participants from the Kerala cluster drew concepts, activities, and case studies from the computerized database. They then adapted and translated the material into Malayalam. The material concentrates on diversity of life forms, case studies on endangered species, and contains 12 simple activities and background information on biodiversity of Kerala.

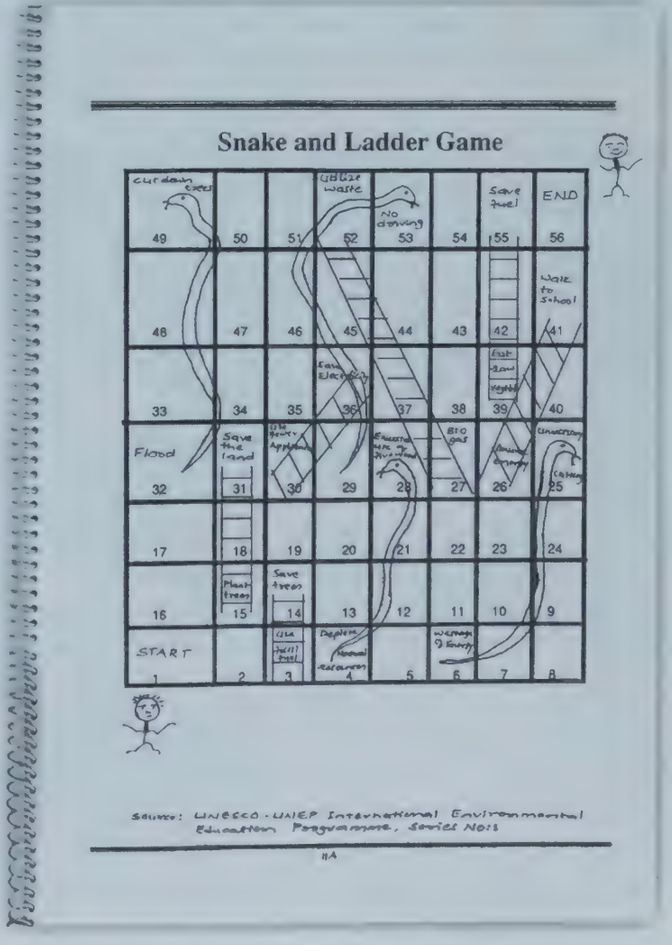
The participants from the Tamil Nadu cluster, keeping the energy crisis of their region in mind, pulled out concepts and activities on energy from the computerized database. These were compiled as a booklet, by adapting and translating into Tamil. The booklet concentrates on energy and soil as natural resources. The 16 simple activities and background information on energy would help the teachers guide the students to understand the sources and usage of energy in the region.

All these booklets were designed and illustrated by the participants themselves, using ideas from some of the physical resources of the bank. They were used by the NGOs to train teachers of their clusters, each of whom then undertook the activities and projects suggested in the booklets in their schools.

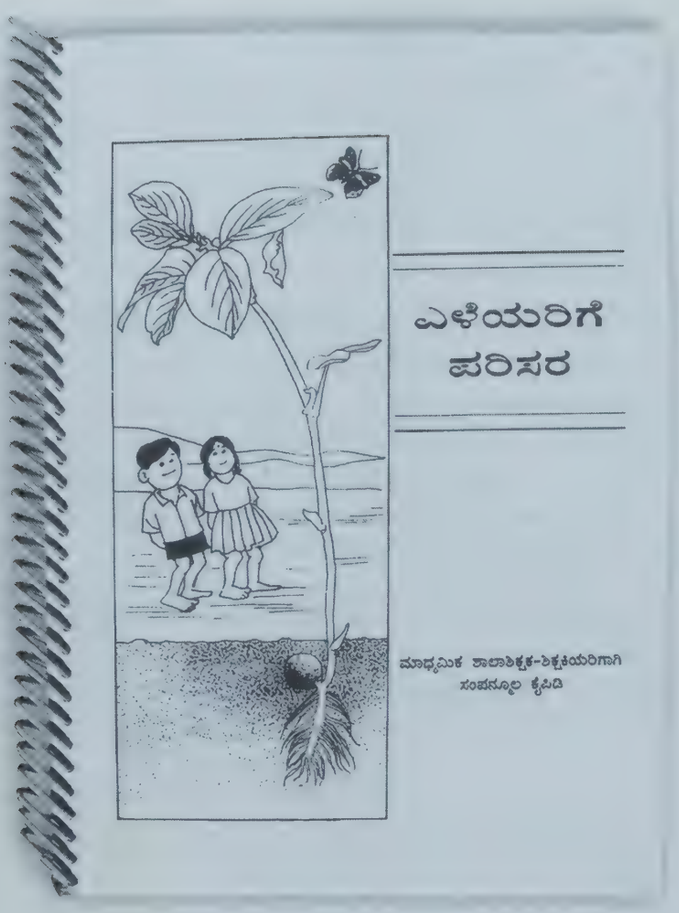
Energizing EE in the State Syllabus

In 1995 the Environmental Education Bank Node, Bangalore along with the Department of State Education Research and Training (DSERT), Karnataka organized two workshops of five-day duration each, to prepare a source book for teachers on Environmental Education.

The rationale for the workshop was that while the existing curriculum has content which can be given an environmental orientation, teachers needed ideas for activities to teach environmental



Game developed by Tamil Nadu teachers



Sourcebook for DSERT

concepts. It was also felt that it would be easier to teach environmental concepts to students if these were related with the curriculum.

The workshop first involved screening of the existing curriculum of higher primary school, and identifying the possible points to infuse environmental concepts, along with relavant background information.

The preparation of the background information involved the extensive use of the physical and database facilities available at the EE Bank. Large numbers of matching activities were also drawn from the Bank.

At the end of these workshops the draft material prepared were edited by a team of CEE professionals and brought out in the form of sourcebook. DSERT has printed and distributed 40,000 copies of this book to all the higher primary schools of Karnataka.

In order to facilitate better use of this book DSERT and CEE South thought of an innovative idea to use the audio-medium to reach out to a large number of teachers in the State. In this connection, CEE South, in collaboration with All India Radio (AIR) and DSERT, organized a four day programme to write audio scripts for all the 15 topics discussed in the sourcebook. The participants included eleven content experts from CEE, key personnel from DSERT, and eight experts from AIR.

On the first day of the programme, the strengths and limitations of audio media were discussed in depth with the content experts in order to facilitate the script writing. Interactions between content experts and media personnel during the next three days helped to produce the 15 scripts, each concentrating on one topic. The scripts were ready at the end of the fourth day.

All India Radio later produced the programme and field tested two programmes in five schools of Bangalore. The positive response of the field test indicated that students could follow the content and that they enjoyed the activities given in the book.

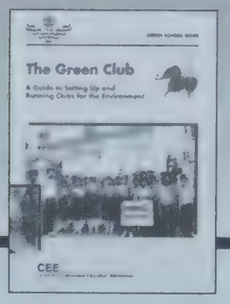
DSERT and AIR, the Audience Research Cell in particular, have taken keen interest to evaluate these activities. About 15,000 teachers have been registered through DIET networks, for evaluating the programme, as also schools, through KRVP's (Karnataka Rajya Vijnana Parishat) regional science centres in various parts of Karnataka to monitor the programme more efficiently.

An evaluation questionnaire prepared during the script writing programme will be circulated by the DIETs and Audience Research Cell of AIR for the pre- and post-programme evaluation. Prizes are planned by the DSERT for the teachers at the end of the programme.

The curtain raiser programme to introduce the use of the book went on air on 13 August, 1998. The programme was broadcast in 15 parts, with each part being aired twice a week, catering to a request from the teachers.

(With inputs from Archana Dange, N. Ramjee, and R. Shailaja)

Development of a Manual for Eco-clubs
Collective Wisdom



Introduction

The Green Club: A Guide to Setting Up and Running Clubs for the Environment was brought out in 1997 by CEE. This manual was the culmination of a long process of doing workshops with teachers and NGOs involved in, or planning to organize, such clubs.

The Need

Since about 1990, several groups (schools and NGOs) had been approaching CEE for help in setting up and running Eco-clubs. Students, teachers, and in some cases, school managements, were interested in getting involved in environment-related activities—not so much in a theoretical way, as through practical, hands-on, project-based activities. Even when schools found it difficult to integrate or infuse EE into the regular mainstream teaching, they found it a popular option for an extra-curricular activity. Eco-clubs were seen to be a good way to do this.

While the desire to organize Eco-clubs was there, schools ran up against many practical problems. Apart from the "Where is the money?" question, the most pressing concern was "How can we go about organizing such activities?" Having set up a club, schools often did not know what projects and kind of activities could be taken up, and how these activities could be conducted.

CEE organized several workshops to help teachers answer these questions. While the first half of the five-day workshops gave teachers a hands-on experience of carrying out EE activities, the last two and half days were spent in collating questions which came up, and in answering them, usually through the collective effort and discussion of the group.

The First Half of the Workshop: Practice

During the first half of the workshop the issues addressed and discussed included "What is EE?", "How can I be an effective environmental educator?", and "How can an Eco-club help me meet the objectives of EE, i.e. improving awareness, attitude, information, skills and action related to the environment, among my students?"

Besides this, teachers were exposed to a variety of experiences and opportunities to develop skills

Photo: Gopalkumar Jain

which they might need to help students undertaking projects—for example, water quality monitoring, development of posters, conducting a survey, etc. An overnight nature camp at CEE's campsite, Sundervan-Bakore, helped teachers appreciate the importance of outdoor experiences in EE and get some practical ideas on how to organize such experiences. Towards the end of this half of the workshop, teachers who were already involved in Eco-clubs shared their experiences, problems they had faced, and discussed how they had overcome them.

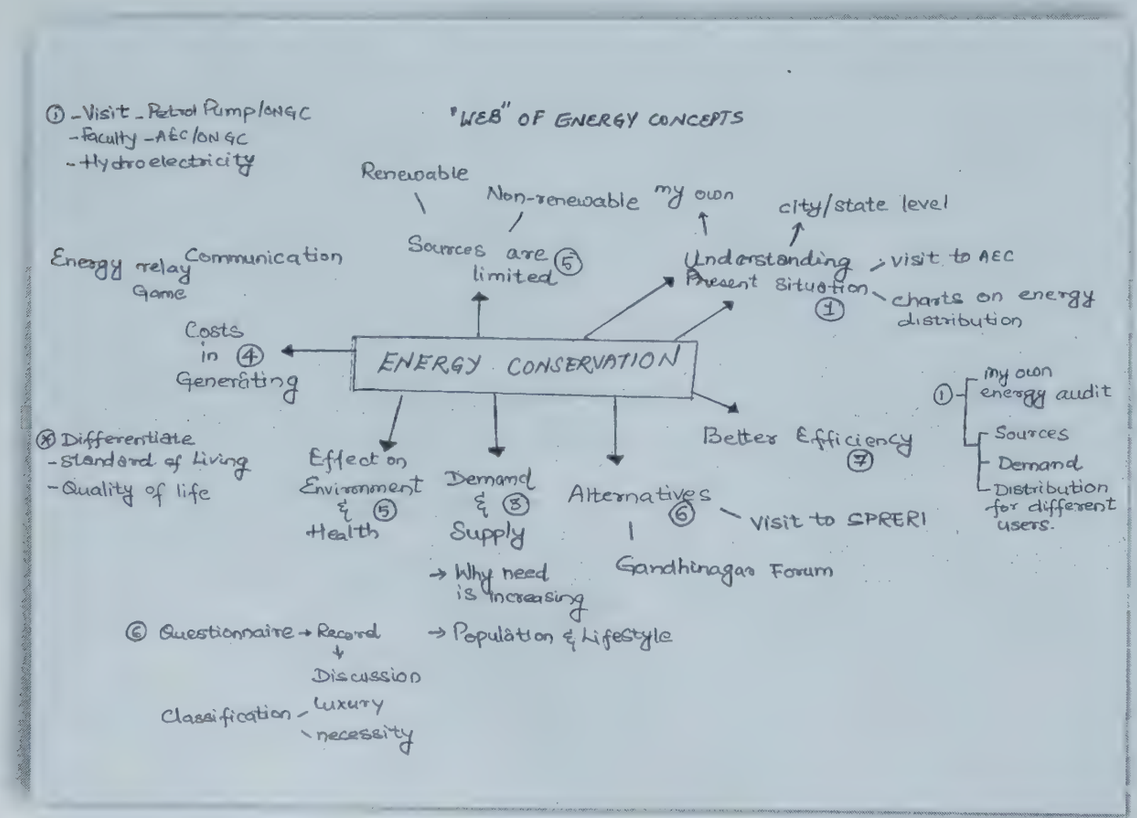
The Second Half: Working together

The second half of the workshop consisted of listing questions regarding various practical aspects of setting up and running Eco-clubs and then brainstorming together to answer these questions. The questions that usually came up were to do with the following:

- Forming an Eco-club;
- Gaining support for Eco-club activities from school authorities, parents, teachers, etc.;
- Running an Eco-club;
- Finding resources for the club;
- Projects that could be taken up;
- Action Projects and how to do them;
- How the Eco-club could reach out to the rest of the school and the community;
- Planning and managing projects.

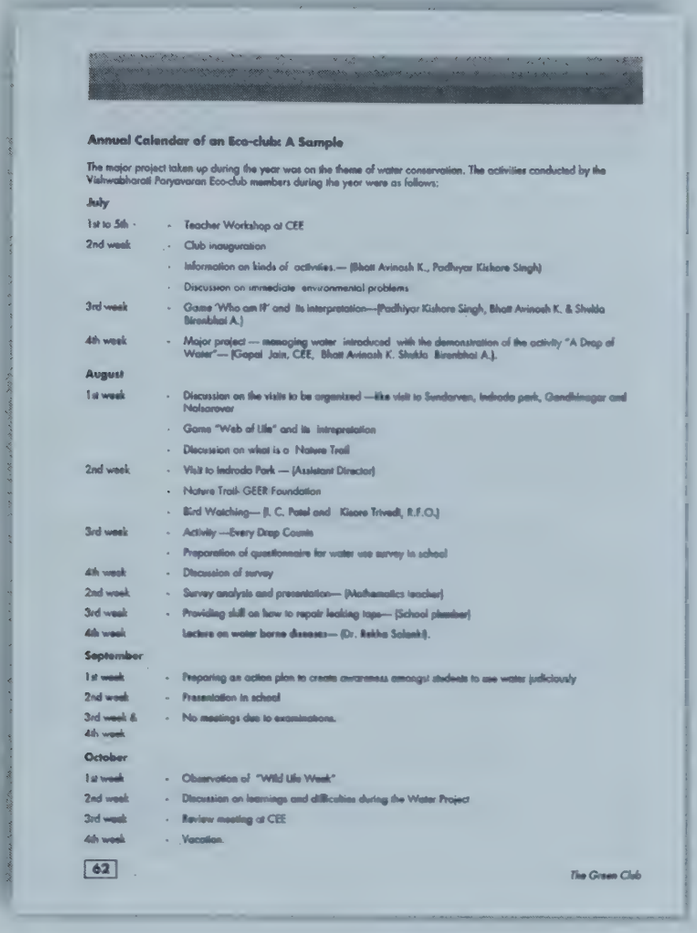
In most workshops, almost all these issues came up. When they did not, the CEE facilitators brought up these issues. Once there was a good coverage of issues, these were grouped into related 'clusters' of issues. The clusters were broadly divided on the basis of points related to the logistics of organizing the club, and those to do with projects that the club could take up. The organizational clusters were taken up first for discussion.

This was done by the participants breaking up into small groups, and choosing one or two clusters to discuss. The small groups would work for about two hours to come up with suggestions and answers to the questions and issues in their clusters. After this, the groups came back to the plenary to present their suggestions. After each presentation, participants from other groups gave their inputs or alternate suggestions. The facilitators also gave their inputs from their experience. After the issues in these clusters were addressed to the satisfaction of the participants, the small groups would go back to complete their notes and give these detailed notes in for editing and compilation.



A 'web' of energy-related concepts

After this, some of the questions related to conducting projects would be taken up. These included questions like "What kind of projects can



Annual Calendar of an Eco-club: A Sample

The major project taken up during the year was on the theme of water conservation. The activities conducted by the Vishwabharati Paryavaran Eco-club members during the year were as follows:

July

1st to 5th - Teacher Workshop at CEE

2nd week - Club inauguration
- Information on kinds of activities.— (Bhatt Avinash K., Padhiyar Kishore Singh)
- Discussion on immediate environmental problems

3rd week - Game "Who am I?" and its interpretation—(Padhiyar Kishore Singh, Bhatt Avinash K. & Shukla Birenbhai A.)

4th week - Major project — managing water introduced with the demonstration of the activity "A Drop of Water"— (Gopal Jain, CEE, Bhatt Avinash K. Shukla Birenbhai A.).

August

1st week
- Discussion on the visits to be organized —like visit to Sundarvan, Indroda park, Gandhinagar and Nalsarovar
- Game "Web of Life" and its interpretation
- Discussion on what is a Nature Trail

2nd week
- Visit to Indroda Park — (Assistant Director)
- Nature Trail- GEER Foundation
- Bird Watching— (I. C. Patel and Kisore Trivedi, R.F.O.)

3rd week
- Activity —Every Drop Counts
- Preparation of questionnaire for water use survey in school

4th week - Discussion of survey

2nd week - Survey analysis and presentation— (Mathematics teacher)

3rd week - Providing skill on how to repair leaking taps— (School plumber)

4th week - Lecture on water borne diseases— (Dr. Rekha Solanki).

September

1st week - Preparing an action plan to create awareness amongst students to use water judiciously

2nd week - Presentation in school

3rd week & 4th week - No meetings due to examinations.

October

1st week - Observation of "Wild Life Week"

2nd week - Discussion on learnings and difficulties during the Water Project

3rd week - Review meeting at CEE

4th week - Vacation.

62 *The Green Club*

Part of annual plan of an Eco-club

be taken up?" "How can students gather information about an issue?" etc. One of the questions which excited the most discussion was the listing of what projects the students could take up. Long lists usually emerged. The participants would then break up into small groups again and discuss these questions and follow the same process as before.

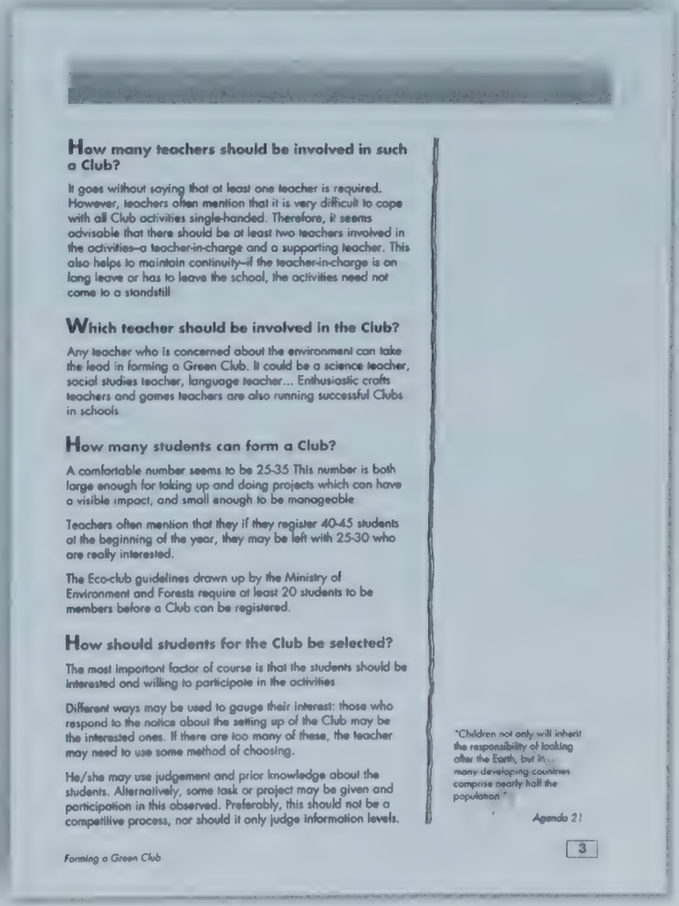
After all these questions had been answered, the key issue of planning a sample year of Eco-club activities was taken up. This was done taking an issue of interest to most participants, e.g. energy conservation.

Collectively, the participants would set the objective for the club activities in relation to the theme: for example, the objective could be "Club members will work to bring down the school electricity bill by 10 per cent and their home bills (kitchen, fuel/petrol/electricity) by 10 per cent.

The participants then drew up the framework within which they must work. e.g. the number of hours and sessions they had for such activities, the money available to them, whether they would be allowed to take the children out for a field trip, etc. This gave them a good understanding of both the constraints and opportunities they were to work within.

After this, the issue was analysed and a web of concepts that needed to be addressed in order to achieve the objective was constructed and sequenced. The concepts were again clustered and the participants once again broke up into small groups to discuss activities which could be undertaken to achieve the various objectives.

The participants developed the activities with the help of the EE Bank's collection of activities (see page 31). They scanned the related activities in the Bank and then selected the usable ones. These were modified and extended as required, and sequenced. Once this exercise was completed, the groups re-convened in a plenary session and



How many teachers should be involved in such a Club?

It goes without saying that at least one teacher is required. However, teachers often mention that it is very difficult to cope with all Club activities single-handed. Therefore, it seems advisable that there should be at least two teachers involved in the activities–a teacher-in-charge and a supporting teacher. This also helps to maintain continuity–if the teacher-in-charge is on long leave or has to leave the school, the activities need not come to a standstill

Which teacher should be involved in the Club?

Any teacher who is concerned about the environment can take the lead in forming a Green Club. It could be a science teacher, social studies teacher, language teacher... Enthusiastic crafts teachers and games teachers are also running successful Clubs in schools

How many students can form a Club?

A comfortable number seems to be 25-35 This number is both large enough for taking up and doing projects which can have a visible impact, and small enough to be manageable

Teachers often mention that they if they register 40-45 students at the beginning of the year, they may be left with 25-30 who are really interested.

The Eco-club guidelines drawn up by the Ministry of Environment and Forests require at least 20 students to be members before a Club can be registered.

How should students for the Club be selected?

The most important factor of course is that the students should be interested and willing to participate in the activities

Different ways may be used to gauge their interest: those who respond to the notice about the setting up of the Club may be the interested ones. If there are too many of these, the teacher may need to use some method of choosing.

He/she may use judgement and prior knowledge about the students. Alternatively, some task or project may be given and participation in this observed. Preferably, this should not be a competitive process, nor should it only judge information levels.

"Children not only will inherit the responsibility of looking after the Earth, but in... many developing countries comprise nearly half the population."

Agenda 21

Forming a Green Club 3

Page from the Manual

presented their activities to each other for comments and suggestions. After this, the annual programme was finalized.

While the teachers recognized that there would be many things which would have to change when the plan was actually put into practice, they felt it was useful to have a detailed plan, prepared with inputs from various "brains", to start off with.

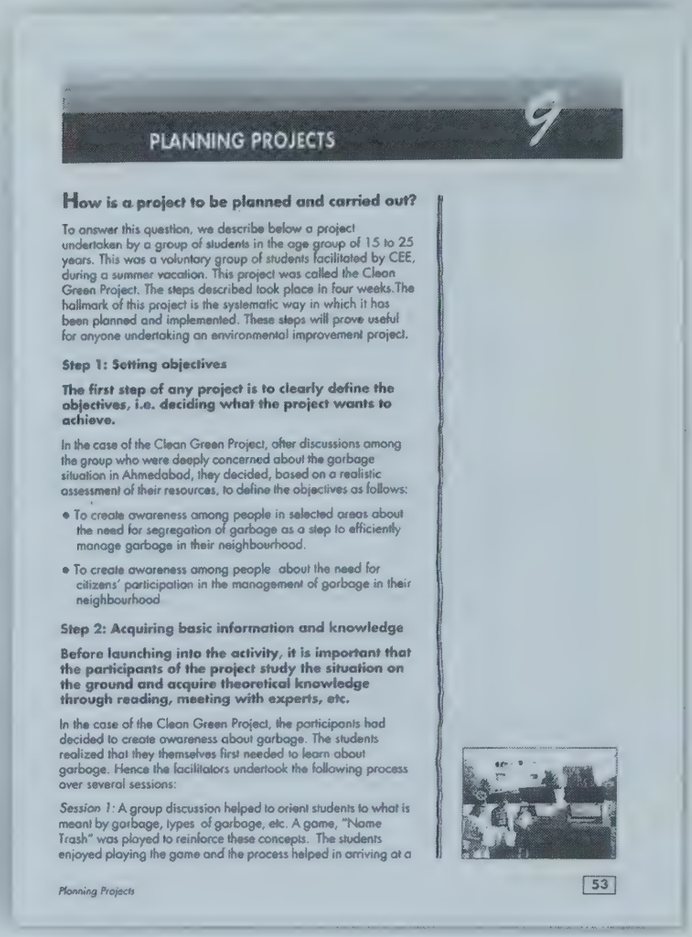
The Manual

After organizing several such workshops and following up the planned activities in the schools through one or two school-years, it was felt that it would be useful to compile the discussions and all the collective wisdom and experience of these workshops in the form of a manual.

It was decided to use the same question-answer format for the manual that was the framework of discussions at the workshops. While this format was convenient and effective to handle the logistic issues, it was felt that the section on projects and how to do them would need to be detailed at some length, as the readers would not be able to access the activities in the EE Bank that the participants in the workshops had been able to.

Thus the process for initiating and carrying out several projects has been detailed, step-by-step, including formats for survey sheets, questionnairies, etc. Also included is a real case study of one such project, which describes the steps and sessions that made up the process.

A sample of records maintained by one Eco-club, and a sample calendar of activities planned by another Club have also been included. In addition, it was felt that some additional information such as listing of sources of A/Vs about the environment, some institutions related to environment etc. were needed as a ready reference for the users.



PLANNING PROJECTS 9

How is a project to be planned and carried out?

To answer this question, we describe below a project undertaken by a group of students in the age group of 15 to 25 years. This was a voluntary group of students facilitated by CEE, during a summer vacation. This project was called the Clean Green Project. The steps described took place in four weeks.The hallmark of this project is the systematic way in which it has been planned and implemented. These steps will prove useful for anyone undertaking an environmental improvement project.

Step 1: Setting objectives

The first step of any project is to clearly define the objectives, i.e. deciding what the project wants to achieve.

In the case of the Clean Green Project, after discussions among the group who were deeply concerned about the garbage situation in Ahmedabad, they decided, based on a realistic assessment of their resources, to define the objectives as follows:

- To create awareness among people in selected areas about the need for segregation of garbage as a step to efficiently manage garbage in their neighbourhood.
- To create awareness among people about the need for citizens' participation in the management of garbage in their neighbourhood

Step 2: Acquiring basic information and knowledge

Before launching into the activity, it is important that the participants of the project study the situation on the ground and acquire theoretical knowledge through reading, meeting with experts, etc.

In the case of the Clean Green Project, the participants had decided to create awareness about garbage. The students realized that they themselves first needed to learn about garbage. Hence the facilitators undertook the following process over several sessions:

Session 1: A group discussion helped to orient students to what is meant by garbage, types of garbage, etc. A game, "Name Trash" was played to reinforce these concepts. The students enjoyed playing the game and the process helped in arriving at a

Planning Projects 53

Case study of a project from the Manual

The manual has been in use for over a year now and users have commented on the ease of use and practical approach. This has been possible only because this manual has emerged as the result of several interactions, of answering questions and addressing issues with the participation of practitioners. All in all, both processes—the workshops and the putting together of the manual—have been very satisfying because they answer a felt need, and answer it through a participatory process.

Catch Them Young: Environmental Education for Children

CEE's philosophy of EE is based on the assumption that EE is a life-long process beginning at the pre-school level and continuing through all formal and non-formal stages. It is universally recognized that if the process is to be truly meaningful, it is best to start early. Thus children become the first and most important target group.

Since its inception in 1984, the Centre for Environment Education has recognized that a true understanding of environment has to start at the school level. Hence environmental education in schools has been one of the important thrust areas of the Centre.

CEE however also recognized that in India, reaching students directly was an enormous task. This was in recognition of the reality that one was talking in terms of reaching nearly 1200 lakh students enrolled in primary and secondary schools, and many lakh more children who were not in school. It implied the necessity of developing material in at least 20 languages in which instruction is carried out across the country.

Identifying Multipliers

Given this scenario CEE decided that initially it would emphasize on a strategy to reach teachers, and through them, the children. This was based on the assumption that through every one teacher, we could reach about 40 children a year, continuing maybe for ten years. And that during their teaching career, a network of inspired, motivated teachers could help spread the message of environment to a vast audience of children. This was much vaster than would be possible if done by a handful of educators based in a Centre located in one part of the country.

CEE thus began to develop programmes and material which were meant to create environmental awareness among students but which were planned for, and addressed to, the teacher who would in turn transmit these to the students. A lot of these took the form of teachers' handbooks which included step by step guidelines for teachers on how to conduct activities with students. At the same time, there was an attempt to include at least one element in the educational packages developed by CEE, which could be seen, accessed, or used directly by students.

Water Package: In the first such package on the theme Water, developed in 1986, the classroom material took the form of a poster which could be displayed in a classroom which could thus be directly seen by the students. The other components of the package, which were a booklet of water-related activities and information cards on different aspects and issues of water, were meant to be used by the teacher for conducting activities with students. (See page 19).

The package also included a set of stickers/labels with attractive photographs. Each student could get one of these. This would give them a feeling of ownership or involvement in the special water programme that the class was involved in.

The Water package and its use by teachers yielded several important lessons in material development. One of these was the very practical one of numbers. How to provide sufficient numbers of student material to cater to an average classroom size of 50-60 students? Some of the feedback indicated that teachers preferred not to distribute these labels at all—rather than having to decide on how to distribute a limited number.

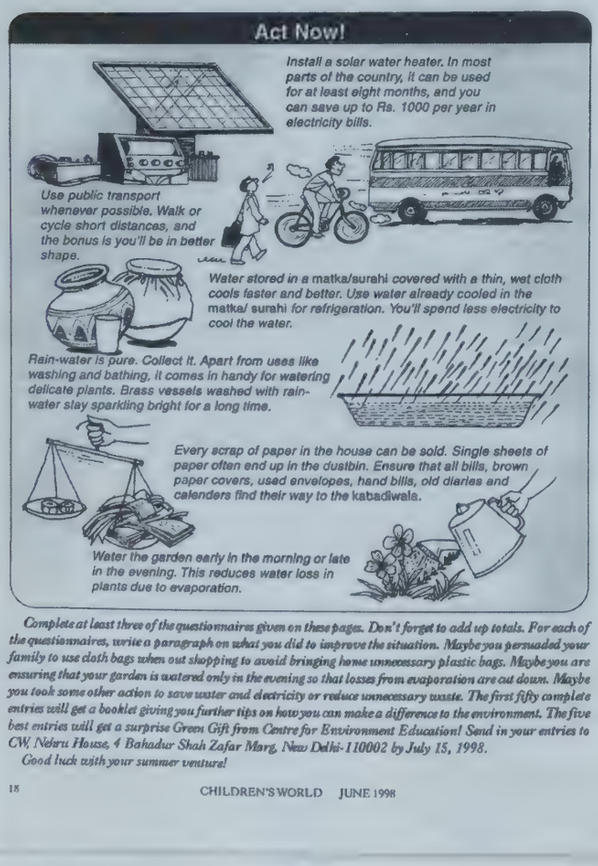
Another concern was how to imbue any such material with maximum educational value rather than mere decorative one. These concerns continued into the process of development of the second such educational package developed on the theme of Floods and Droughts.

Floods and Drought: This time the classroom display material took the form of a set of 11 posters, which could be put up not just in a classroom, but at a more public venue in the school

or community, thereby giving viewing access to greater numbers of students. (See page 21).

The individual student component took the form of book labels. Every packet now included two sheets of 36 labels each. It was hoped that these could be equitably distributed in an average class size. The idea of having a label was that once stuck on the cover of a notebook, it would at least be seen frequently by the student, helping thereby to reinforce at least one message. This still remained a somewhat passive/one-way medium of communication.

Conserving Our Water Resources: The development of the next package on the theme 'Conserving Our Water Resources' led us into exploring other ways through which we could reach students directly, and also involve them in some way in the material. The attempt led to the development of a Board Game on the theme. This was included in the package which also contained a teachers' manual and a classroom display poster. While the game succeeded in getting students to 'interact', as it were, with the medium, it did lead us back to the same concern with which we had started. That was how to cater to large numbers, simultaneously. While a board game could directly involve up to four children, what of the remaining 55 or 45 students? As always, sheer numbers proved the challenge.



Act Now!

Install a solar water heater. In most parts of the country, it can be used for at least eight months, and you can save up to Rs. 1000 per year in electricity bills.

Use public transport whenever possible. Walk or cycle short distances, and the bonus is you'll be in better shape.

Water stored in a matka/surahi covered with a thin, wet cloth cools faster and better. Use water already cooled in the matka/ surahi for refrigeration. You'll spend less electricity to cool the water.

Rain-water is pure. Collect it. Apart from uses like washing and bathing, it comes in handy for watering delicate plants. Brass vessels washed with rain-water stay sparkling bright for a long time.

Every scrap of paper in the house can be sold. Single sheets of paper often end up in the dustbin. Ensure that all bills, brown paper covers, used envelopes, hand bills, old diaries and calenders find their way to the kabadiwala.

Water the garden early in the morning or late in the evening. This reduces water loss in plants due to evaporation.

Complete at least three of the questionnaires given on these pages. Don't forget to add up totals. For each of the questionnaires, write a paragraph on what you did to improve the situation. Maybe you persuaded your family to use cloth bags when out shopping to avoid bringing home unnecessary plastic bags. Maybe you are ensuring that your garden is watered only in the evening so that losses from evaporation are cut down. Maybe you took some other action to save water and electricity or reduce unnecessary waste. The first fifty complete entries will get a booklet giving you further tips on how you can make a difference to the environment. The five best entries will get a surprise Green Gift from Centre for Environment Education! Send in your entries to CW, Nehru House, 4 Bahadur Shah Zafar Marg, New Delhi-110002 by July 15, 1998.

Good luck with your summer venture!

Page from Children's World magazine

Mass media: Print: Around this time some developments helped to tackle this concern of how to reach a wider audience. CEE's News and Features Service (CEE-NFS), a non-exclusive feeder service to newspapers and magazines across the country, used to carry 'features'. These included informative pieces on animals, birds, plants etc. written in an easy-to-read style. These were intended for popular reading, for a general audience. We found however, that these pieces usually found their niche in the children's pages or children's supplements in several newspapers (Maharashtra Herald, Deccan Herald, Indian Express). The addition of ACT NOW—a series of handy tips on individual actions for environmental protection—to the CEE-NFS despatches, saw these being widely used in children's spaces in the print media.

Through this channel, CEE was able to reach out to a much wider audience, through a non-school route.

A further development of this was in the form of a series of special packages developed exclusively for some children's magazines. These were often theme-based and were carried in special issues of magazines such as the Environment Day issue, or Wildlife Week special.

Audio-visual: While these were attempts at achieving multipliers through the print media, CEE was also conscious of the need to tap the enormous potential of the audio-visual media to reach a much wider audience, often transcending limitations of literacy, language, etc.

1988-1989 saw the opening of this new dimension of communicating to children through the Children's Environmental Education Television project (CEETV). This collaborative project undertaken with the State University of New York

at Syracuse (SUNY) was an effort to increase environmental awareness among children in India through educational television.

The project involved the production of a series of integrated learning modules, each consisting of a video and teacher's guide on effective use of the video as an educational resource. The videos were planned to be used both through broadcast and non-broadcast modes, i.e. in a situation where the interpretation and follow-up by a facilitator would form an integral part of the package.

Drakhi, the pilot package under this series has been widely used, mainly in the non-broadcast mode. The experience has yielded several learnings especially in respect of how children respond to this medium, and how its effectiveness can be maximized.

Many of these and other insights on the topic have been compiled into a publication titled *Experiences of Children's Television.* This provides a handy reference for educators who plan to use this attractive medium for reaching out to children.

Thus, in the initial years, CEE explored and experimented with various cost-effective strategies of reaching children through a variety of "multipliers", starting with the teachers, and including mass media, print as well as audio-visual.

Books for Children

In 1994 the opportunity to develop some environmental education material for children was offered by the South Asia Cooperative Environment Programme (SACEP). CEE is the focal point of SACEP for EE. SACEP asked CEE to develop and print a series of four environment-related story books for children. The books were to be distributed in all the countries covered by SACEP. The themes were set by SACEP. These were (i) Pollution (ii) Waste Reduction and Recycling (iii) Forests and Their Values and (iv) Conservation of Natural Resources.

CEE took this as an opportunity not only to put its learnings and ideas into concrete products, but also to explore the challenge of reaching out beyond India to children of neighbouring countries of South Asia: Sri Lanka, Pakistan, Nepal, Bangladesh, Bhutan, Maldives.

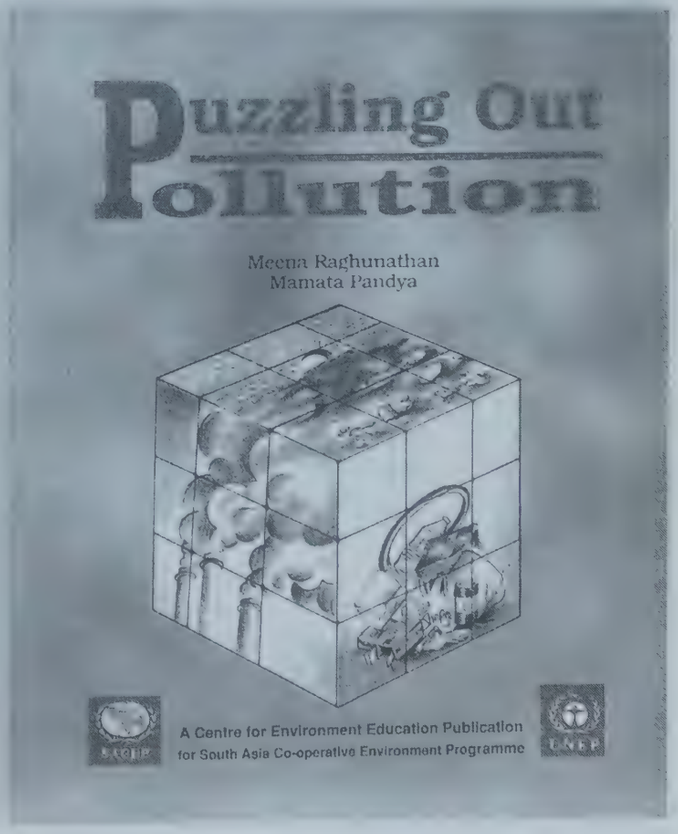
The project began on the basis that these books would be developed so as to cover environmental themes in a manner which would be different from textbooks.

In planning the design and content of the series it was decided that each of the four books would have a different format and presentation. This would give greater scope for innovation and experimentation.

It would also make for a series which had four rather different kinds of books, making it an attractive package with considerable variety.

One common factor which would lend a sense of identity to the series, and also make these books more than just story books, would be that each book would include some activity ideas that children could carry out themselves.

These would make the reading experience a participatory rather than a passive one. The activities would also help to reinforce the messages that the stories conveyed.



Cover of *Puzzling Out Pollution*

It was hoped that this series of "Read and Do" books would help to lead the children from awareness, to knowledge, to using some skills through participation.

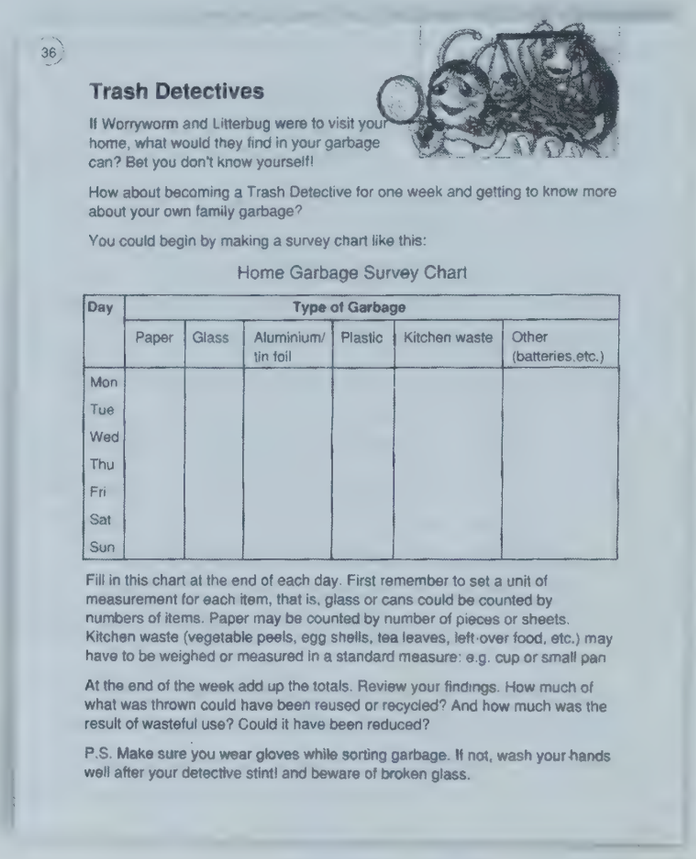
The four books that emerged from this thinking and development process each had a special identity. These are described below.

Puzzling Out Pollution: The theme of pollution is in itself fairly technical, and covers several aspects, issues and dimensions. It was felt that perhaps the best way to tackle this was through a "magazine format"which could include a variety of features: straight information and facts, activities, puzzles, case studies etc. This would facilitate coverage of the wide range of topics under the theme without forcing these into a sequential story line. This worked well and the book has been popular with its readers.

Where's Away: The theme of waste reduction and recycling was eventually transformed into a long story. It took the form of an adventure related by two creatures: a worm and a bug. They take the reader on a journey with them, to follow the route of waste—where it comes from, where it goes and what happens to it. While factual accuracy was ensured even in the fictional account, a follow-up in the form of more information and activity ideas made up the second half of the book. Through this, children could actually take up surveys of garbage generated at home, and packaging, and recycling-related projects, thereby relating the concepts to their own daily lives.

That the appeal of the book is not just for reading, is evident from the fact that we continue to find out about several innovative ways in which teachers have used these. Apart from simple read-aloud sessions, teachers have used overhead transparencies with illustrations from the book to turn this into an audio visual experience for children. Students have developed and performed skits based on the story. This has strengthened our belief that given an interesting starting point and reliable information, the users' creativity finds numerous channels in interacting with the material.

Forest Tales: Perhaps the most discussed environmental topic in school text books is forests and their importance. We wanted to avoid the cliched coverage of this theme and yet convey the essence—the vital role of forests in sustaining a healthy environment. We felt that stories about forests could be one route to this. Forests have traditionally featured in stories around the world. We thought it would be interesting to find such stories not just from India but from countries in the region and use these for the book. Hence we started the process of acquiring such stories through different contacts in these countries. Having identified some potential material, we found that we needed to 'adapt' these to convey the message of the importance of forests and the need for forest conservation. This proved to be an interesting exercise. We did eventually have a collection of seven stories—some based on stories from Bhutan, Sri Lanka, Tibet; others on true incidents and people; and a few original stories. The style and flavour of folk tales was retained in the narration and illustrations of the book. In keeping with the identity of the series, each story suggested an activity that children could do, while the centrespread provided important information and facts about forests.



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Trash Detectives

If Worryworm and Litterbug were to visit your home, what would they find in your garbage can? Bet you don't know yourself!

How about becoming a Trash Detective for one week and getting to know more about your own family garbage?

You could begin by making a survey chart like this:

Home Garbage Survey Chart

Day	Type of Garbage					
	Paper	Glass	Aluminium/ tin foil	Plastic	Kitchen waste	Other (batteries,etc.)
Mon						
Tue						
Wed						
Thu						
Fri						
Sat						
Sun						

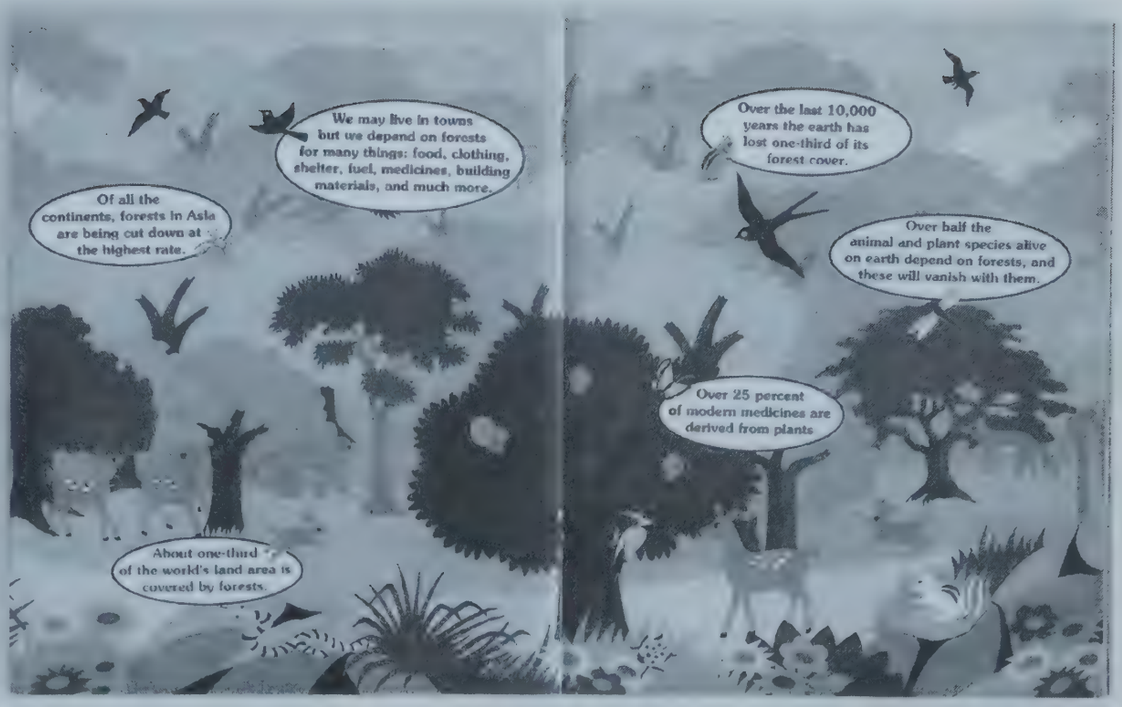
Fill in this chart at the end of each day. First remember to set a unit of measurement for each item, that is, glass or cans could be counted by numbers of items. Paper may be counted by number of pieces or sheets. Kitchen waste (vegetable peels, egg shells, tea leaves, left-over food, etc.) may have to be weighed or measured in a standard measure: e.g. cup or small pan

At the end of the week add up the totals. Review your findings. How much of what was thrown could have been reused or recycled? And how much was the result of wasteful use? Could it have been reduced?

P.S. Make sure you wear gloves while sorting garbage. If not, wash your hands well after your detective stint! and beware of broken glass.

Page from *Where's Away?*

ABC...Naturally: Conservation of Natural Resources—this was the theme of the fourth book. It took a while to arrive at how to handle a theme so large, and made up of so many dimensions. We wanted to avoid the "gloom and doom" approach, as also the preaching- and teaching-one. It was not possible to thread everything into a story, and we did not want to repeat the magazine format. Then we arrived at the decision to use a series of verses, sequenced from A to Z. Each page carried a verse which covered a number of natural resources starting with that letter. For example:


We may live in towns but we depend on forests for many things: food, clothing, shelter, fuel, medicines, building materials, and much more.
Of all the continents, forests in Asia are being cut down at the highest rate.
About one-third of the world's land area is covered by forests.
Over the last 10,000 years the earth has lost one-third of its forest cover.
Over half the animal and plant species alive on earth depend on forests, and these will vanish with them.
Over 25 percent of modern medicines are derived from plants

Centre pages from *Forest Tales*

S is the sun, source of all life
The giver of energy, the giver of light
S is the soil more precious than gold
Lost as it flows away, flies away - that gold
we must hold.

And so on, through all the letters of the alphabet. Having arrived at the text, we ran into unexpected difficulties in getting the verses illustrated. The nature of the text made it difficult for artists to visualize and combine into one picture elements as disparate as moon, mammoth, man and mines.

After several unsatisfactory attempts, we tried another approach—that of getting children to interpret and illustrate the text. This experiment was carried out through several sessions with students of one school. The result was more than satisfactory. It was original, fresh, and definitely the children's own interpretation of the text. The outcome was a book which evolved out of a unique participatory experience involving authors, illustrators, readers. To make it even more participatory the readers were invited to share the process of the making of the book, given guidelines on how to write poems themselves, and also invited to fill colour into the black and white illustrations which alternated with the colour illustrations in the book.

The SACEP series provided a tremendous opportunity to evolve, develop and share a number of CEE's ideas about EE material for children. It was also a chance to think and plan material which could be relevant not just across India but across countries of South Asia. This in itself was challenging as it meant choosing images, settings, characters, tone and flavour that children in the region could relate to; to find ways of transcending national boundaries and cultural diversities, and reaching out to the universal 'child' in every person.

Oceans Omnibus: A very focussed brief marked the start of a project commissioned by the Vasant J. Sheth Memorial Foundation. They requested CEE to develop a book which would bring alive the excitement of oceans for young people, with emphasis on the Indian Ocean. The Foundation saw the book as a way to spark an interest in school-leaving youth, to take up careers related to oceans.

The challenge for CEE was not only how to collect the relevant information (especially related to the

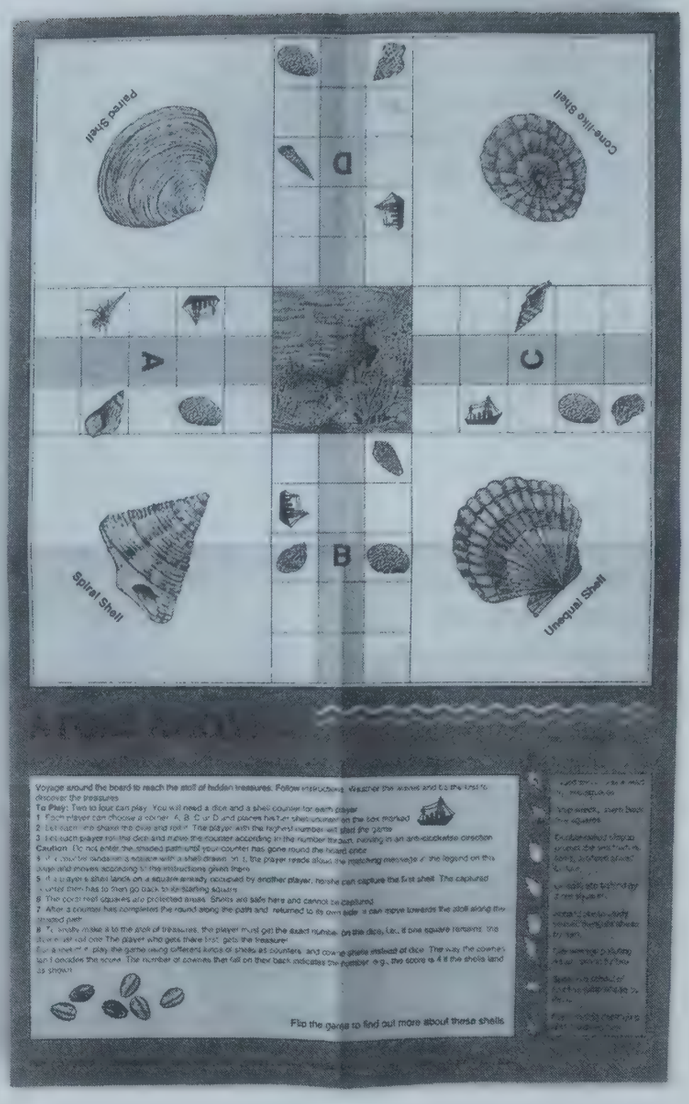
Indian Ocean), getting it checked for accuracy, but, most important, how to present it in an attractive format.

The outcome was a substantial collection of relevant information, presented in an easy readable language and format and supported by illustrations.

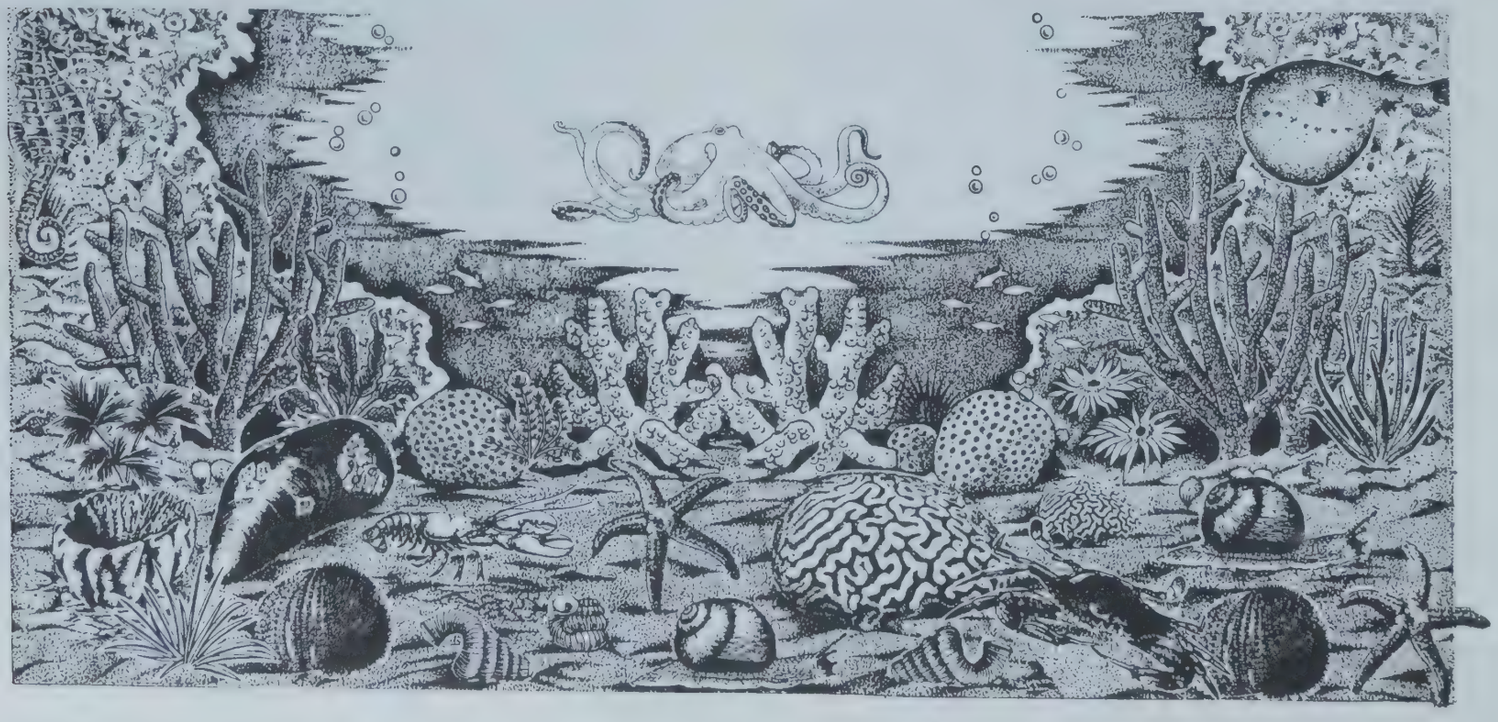
The book also included a chapter giving a glimpse of the variety of ocean-related careers/ occupations that are available, as well as a listing of addresses of relevant institutions that interested students could contact. An unusual feature of the book was the inclusion of four 'charts' on specific information not covered in the book. These covered illustrated information on marine life in the oceans around India; threats to India's coastline and ocean life; cultural and natural heritage sites on or off our coastline, and facts about shells, and a game using shells.

This took us back, once again, to CEE's basic philosophy of making all material 'interactive', rather than a one-time read and shelve product.

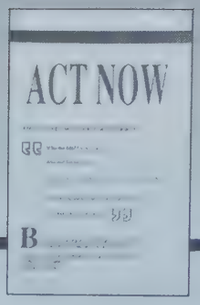
Every project is taken up with the excitement of using the opportunity of exploring new avenues, testing new ideas, and evolving new techniques that could contribute to the creation of a generation of environmentally literate and empowered young people.



Shells game from *Oceans Omnibus*



The Growth of an Idea: The Many Forms of ACT NOW



The sustainability of any programme or material is often of the most concern to designers of EE programmes and material. Numerous devices are sought to be built in with the hope that this would ensure the durability and sustenance of the programme.

Another factor that is worth thinking about is the way in which an "idea" introduced for one programme grows and develops over a period of time, to be used and adapted for a number and variety of situations, programmes and material. This piece shares the growth and transformation of one such idea, into a number of *avatars*.

Awareness to Action

Mass Media

In the early 1990s more and more people were getting interested in the environment. But there was also the feeling that environment was too large and complex an issue for any one to make an impact or difference—and therefore one did not really need to do anything. It was in this context that we decided we would bring out a handy booklet giving practical tips on what people could do in their daily lives to be more environment-friendly, as also providing some explanation on the issue. This booklet was titled ACT NOW.

CEE runs an environmental News and Features Service (CEE-NFS) which supplies environment-related news items, features and articles to nearly 2000 newspapers, magazine, non-governmental organizations, educational institutions and individual subscribers across the country.

In 1990, CEE-NFS carried a series of special packages. These were meant to accompany the telecast of a ten-part television series *Race to Save the Planet* (RTSTP). The TV episodes were telecast from mid-October to mid-December 1990, every Sunday morning on Doordarshan. The RTSTP series examined major environmental questions facing the world during the 1980s and 1990s. To

Poster for RTSTP series

generate interest in the programme and relate the content of the films to environmental problems in India, CEE developed supporting material for each episode. This material took the form of information packages, which were disseminated through CEE-NFS. The despatch of the packages was timed so as to enable the newspapers to publish the relevant package to coincide with the telecast of the weekly episode.

Each information package contained a synopsis of the week's episode, a case study from the episode, and a component which contained questions and statements which help put the issues raised by the programme in an Indian perspective. The questions were also intended to make readers think about how these issues related to them in their everyday life.

This component was called ACT NOW. The idea was to take issues from the realm of the abstract and global to the concrete and local, and above all to relate to the individual and to inspire and guide the individual to take some action in his/her daily life which would contribute to a better environment.

For example, one of the episodes of the RTSTP series was titled 'Waste Not, Want Not'. It dealt with different aspects of waste in the 'throw away' societies, as well as societies where garbage is a valuable resource. The film also explored innovative approaches to tackling the problem. Under the ACT NOW, were included five 'Points to Ponder' which brought the issue home to the reader. One example:

- Nature's own packaging is unbeatable. Can you think of a more efficient or environmentally compatible way of packaging the contents of a banana or a coconut?

  List at least five items of daily use whose packaging has changed considerably in the last few years. Is it in any way better than the traditional packaging? Does the new packaging have the potential of becoming a threat to the environment? If so, how?

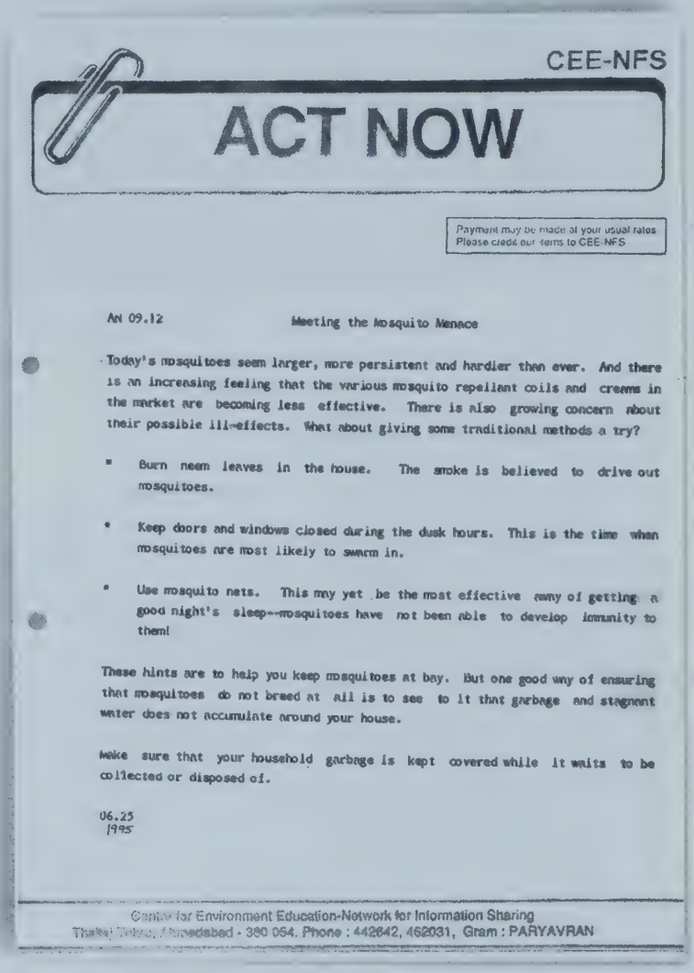
To create greater interest and involvement, ACT NOW was designed to be participatory. Readers were invited to send in their responses. In turn they received gifts in the form of educational material developed by the Centre.

The RTSTP packages were used, in entirety or in part, by newspapers in many parts of the country. This evoked a good response from readers who sent in replies to the ACT NOW points and questions.

At the end of the ten weeks of special despatches, the CEE-NFS team felt that the ACT NOW component had a great scope and enough reader appeal to be continued as part of the regular weekly CEE-NFS despatches. Thus, in 1991, this new component was added to the regular contents of the despatches, which consisted of News, Feature and Special Article.

Even as a weekly feature, ACT NOW continued its attempt to be topical, relatable, practical, and, above all, to inspire action. This meant that the contents had to be linked up to whatever was current. Thus ACT NOW related to festivals (Diwali or Holi); events (conferences, national budget, Wildlife Week); special days (World Environment Day, Anti-Tobacco Day); times of the year (summer vacation, examination time, monsoon) and general tips on living and life styles (traditional tips on household pest control, looking at packaging). In all cases, this brief piece carried some salient facts and related action points that an ordinary person could quite easily adopt, in a style that was not "preachy" but rather a "let us try it together" tone.

The CEE-NFS ACT NOW weekly despatch continued through 1991 and 1992. It found its place in a number of newspapers, magazines, newsletters and other kinds of publications, often in translation into a number of other languages. This *avatar* of ACT NOW was an attempt to spread the "action message" of EE through an existing network of print media.



CEE-NFS

ACT NOW

Payment may be made at your usual rates
Please credit our items to CEE-NFS

AN 09.12 Meeting the Mosquito Menace

Today's mosquitoes seem larger, more persistent and hardier than ever. And there is an increasing feeling that the various mosquito repellant coils and creams in the market are becoming less effective. There is also growing concern about their possible ill-effects. What about giving some traditional methods a try?

- Burn neem leaves in the house. The smoke is believed to drive out mosquitoes.
- Keep doors and windows closed during the dusk hours. This is the time when mosquitoes are most likely to swarm in.
- Use mosquito nets. This may yet be the most effective way of getting a good night's sleep--mosquitoes have not been able to develop immunity to them!

These hints are to help you keep mosquitoes at bay. But one good way of ensuring that mosquitoes do not breed at all is to see to it that garbage and stagnant water does not accumulate around your house.

Make sure that your household garbage is kept covered while it waits to be collected or disposed of.

06.25
1995

Centre for Environment Education-Network for Information Sharing
Thaltej Tekra, Ahmedabad - 380 054. Phone : 442642, 462031, Gram : PARYAVRAN

Sample of CEE-NFS ACT NOW weekly despatch

ACT NOW—The Exhibition

The next stage in the growth and development of ACT NOW came in 1993. This time the idea took the form of an exhibition. It began with an invitation to CEE to participate in the India International Trade Fair 1993, held at Pragati Maidan in New Delhi. CEE was to put up its exhibition as part of the theme pavilion of the Ministry of Environment and Forests, Government of India. The theme was Environment and Development.

The idea of CEE's own theme for the exhibition evolved out of internal brainstorming by the members of the Centre.

The theme of the pavilion itself provided opportunities for tackling a variety of global issues and topics such as Biodiversity, Climate Change, Sustainable Development, etc. However, the CEE team felt that, once again, this could be taken as an opportunity to tackle more immediate, local issues, which concern an average urban dweller. The idea was to not only create awareness of issues, or give the relevant data about these, but also to provide the viewer with practical tips on what each of them could do about this. It was, as summed up by the opening panel, a call that "you can make a difference".

All this was visualized as being incorporated through a series of panels each dealing with one issue, e.g. electricity, water, cooking fuel, solid waste, packaging, etc.

The format of each panel would be such that the key messages could be communicated with minimum text, aided by a strong visual.

Thus, each had a title which reflected the specific theme in a catchy way (e.g. 'Current Use' for electricity), 'Water Ways' (for water), 'Right Recipes' (for cooking fuel and habits), 'Problem Packs' (for packaging etc.)

There was also, for each, a short statement which linked the theme with the environmental impact of the issue e.g. In the poster titled Current Use, this was "Any method of producing power has some impact on the environment".

YOU CAN MAKE
A DIFFERENCE
Pollution, deforestation, greenhouse effect, ozone hole .... Big names for big problems. But the solutions are not all big and complex.
Small actions can make a difference to these big problems. They alone will not solve the problems, but they will help.
Show your concern, show your care.
ACT NOW
To make a difference for our environment

Opening panel of ACT NOW exhibition

The facts related to the theme were then placed at relevant places on the visual in the form of blurbs. In order to act, it was felt, people needed to understand the overall context as well as their own part in the problem and solution. They need hard data, as well as specific action tips.

These took the form of data such as:

- A 40 watt tube light gives as much light as a 100 watt bulb and uses less electricity;
- Dust can decrease lighting levels by 20-30 per cent and shorten the life of electrical fixtures;
- Electric irons consume 400-500 watts per hour.

And finally, at the bottom was the "action key" to the theme—or what we described as the ACT NOW pointers. These consisted of simple tips on

how every individual could adopt these as a personal measure for improving the immediate environment and towards a more sustainable ecofriendly lifestyle.

For example:

- switch off appliances when not in use;
- keep bulbs, tubes etc. free of dust.

The theme panels were supplemented with link panels that carried detailed information as well large photographs illustrating some key points. These were planned to highlight, reinforce, and enrich the information given in each panel. The panel supplementing the one on Current Use carried large photographs of a person cleaning a light bulb, solar water heating panels etc.

CURRENT USE
A fan, which is on round the clock will consume about 2 units of electricity
A 40 watt tubelight gives as much light as a 100 watt bulb, and uses less electricity
Dust can decrease lighting levels by 20 - 30 per cent and shorten the life of electrical fixtures
Desert coolers use a fraction of the electricity that an air conditioner does, but are as effective in dry climates
Electric irons consume 400 - 500 watts per hour
TVs consume about as much electricity as an 80 watt bulb
Any method of producing power has some impact on the environment
ACT NOW
Switch off appliances when they are not in use.
Keep bulbs, tubes, etc. free of dust.
Use tubelights instead of incandescent bulbs.
Use natural light wherever possible.
Explore ways of keeping the house cool without using electricity — use khus curtains, whitewash the terrace, keep curtains drawn.
Use solar water heaters rather than geysers or immersion heaters.
Avoid using batteries. They use up more energy in the making than they actually provide.

Theme panel for electricity

In addition to the panels, the exhibition introduced the element of interactive exhibits that once again related to the respective themes. This component was added based on the thinking that in an exhibition situation, where there is a continuous stream of visitors (in the case of a venue like Pragati Maidan these would be a mix of adults and children, and from diverse backgrounds) there is not much time or inclination on the part of the visitors to really read and take in the messages on the panels. The tendency would be for people to quickly walk through taking in a general impression of the display, rather than focussing.

It was thought that if there were some points at which people stopped and did something, these would serve as an opportunity to focus. At the same time, these points had to be planned so that there was no overcrowding, or lead to a situation which impeded the flow of visitors. Keeping all this in mind, the resulting hands-on exhibits attempted to directly involve the visitors in activities that demonstrated some of the points raised in the theme panels.

For example, visitors measured the quantity of water that dripped from a leaking tap in one minute; they observed an electric meter to find out how much electricity was consumed by various appliances which were plugged into a point directly attached to the meter. A small game was used to introduce the concept of sorting garbage; a demonstration on putting waste material to use, and a counter where visitors could use available post cards to write to the relevant local authorities about environmental problems in their neighbourhood—these were some of the hands-on exhibits.

It was felt that participating in such activities, even briefly, would indicate the first sign of commitment towards doing something about one's environment. The message was reinforced that for every individual, it was not only crucial, but also possible, to "ACT NOW".

The ACT NOW exhibition was well received at the Trade Fair in Delhi. It was then put up at Ahmedabad where organized school groups were invited to visit and participate. A short film on the exhibition was produced by the Gujarat

Institute of Educational Technology (GIET). The film has been telecast several times as part of the school programmes transmission of Doordarshan Ahmedabad.

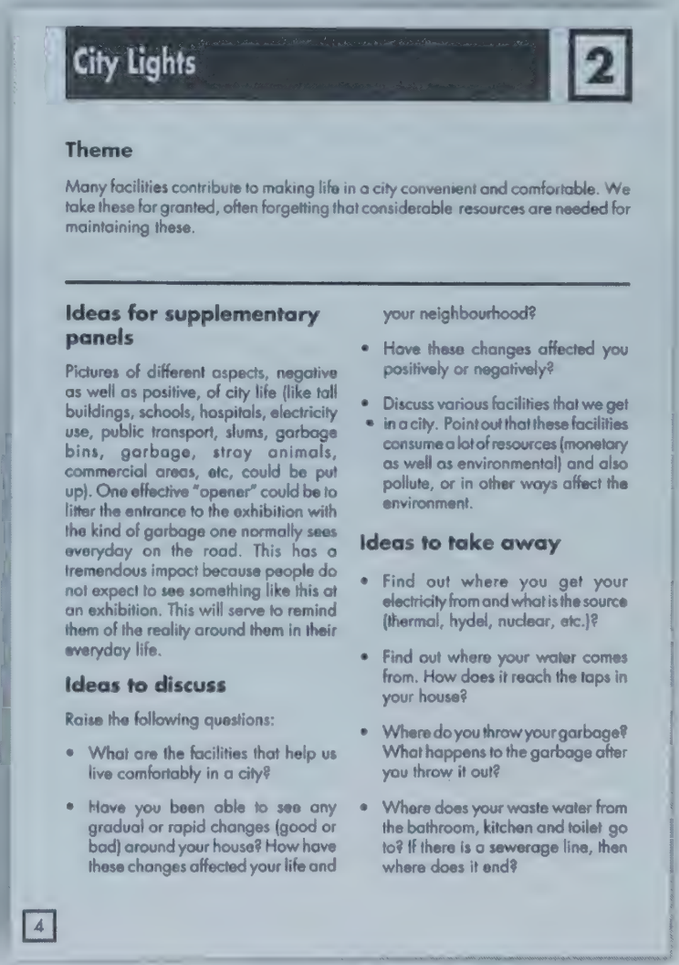
In June 1994, to mark World Environment Day, the exhibition was put up at the Viswesharaya Industrial and Technical Museum, Bangalore. Here visitors included school groups as well the many tourists who visited the science museum.

At all places there were volunteers present who would help to interpret the panels as well as facilitate the hands-on activities. The volunteers were first oriented to the exhibition and their role in relation to the visitors.

The Posters: Following this, there were requests from several parts of the country to borrow the exhibition display. However, this exhibition, as it had been fabricated, consisted of heavy and bulky panels and other components, which made transportation and setting up at different venues rather cumbersome as well as expensive. At the same time, not giving the exhibition maximum exposure meant that we could not maximise the effort put into conceptualizing the exhibition, and the interest and response it evoked. Thus CEE began to explore a system by which all these efforts could be used to maximum effect in a more cost-effective way. One possibility was a poster set that could be used by a variety of users (schools, community groups, special groups, eco-clubs, consumer education groups, etc.). This also offered the flexibility of having the potential to be put up anywhere—indoors or outdoors, in a classroom or community hall, etc; and being arranged to best suit the conditions and facilities available.

Eventually it was planned that the main panels could be converted into a set of nine posters which could be printed in large numbers and hence made available widely and easily. These posters would constitute the main framework of an exhibition that could include several other components to make it more complete and interactive. Ideas and guidelines on how this could be done were described in an accompanying booklet titled 'Setting up the Exhibition'. This contained a number of suggestions on how the posters could be supplemented with a number of other "link panels"; in other words, tips on how to optimize the posters to create a full-fledged exhibition. The link panels would enable the inclusion of local information, data, concerns etc. These could be obtained locally, or even better, put together by children themselves. Also described were ideas for interactive exhibits (many of which had already been tried out in the previous exhibitions).

All our previous experiences had reinforced our belief that for any exhibition to really come alive, there must be facilitators or interpreters who could invite the visitors to participate more actively in the visit, as well as generate discussion, or be available to respond to visitors' questions or comments. The exhibition booklet also clearly explained the advantage of having such facilitators, whether they be senior students (in a school situation) or volunteers (in a public exhibition situation).



City Lights 2

Theme

Many facilities contribute to making life in a city convenient and comfortable. We take these for granted, often forgetting that considerable resources are needed for maintaining these.

Ideas for supplementary panels

Pictures of different aspects, negative as well as positive, of city life (like tall buildings, schools, hospitals, electricity use, public transport, slums, garbage bins, garbage, stray animals, commercial areas, etc, could be put up). One effective "opener" could be to litter the entrance to the exhibition with the kind of garbage one normally sees everyday on the road. This has a tremendous impact because people do not expect to see something like this at an exhibition. This will serve to remind them of the reality around them in their everyday life.

Ideas to discuss

Raise the following questions:

- What are the facilities that help us live comfortably in a city?
- Have you been able to see any gradual or rapid changes (good or bad) around your house? How have these changes affected your life and your neighbourhood?
- Have these changes affected you positively or negatively?
- Discuss various facilities that we get in a city. Point out that these facilities consume a lot of resources (monetary as well as environmental) and also pollute, or in other ways affect the environment.

Ideas to take away

- Find out where you get your electricity from and what is the source (thermal, hydel, nuclear, etc.)?
- Find out where your water comes from. How does it reach the taps in your house?
- Where do you throw your garbage? What happens to the garbage after you throw it out?
- Where does your waste water from the bathroom, kitchen and toilet go to? If there is a sewerage line, then where does it end?

4

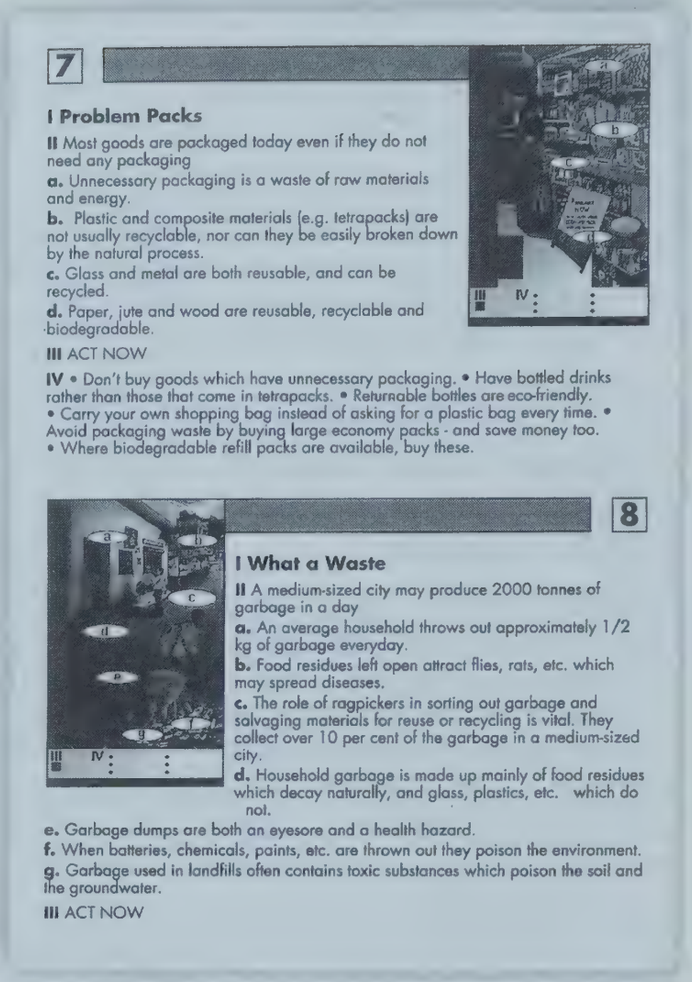
Page from booklet *Setting up the Exhibition*

The booklet also carried a list of possible points that facilitators could raise to generate discussion related to each theme poster. These were planned as 'starters' for facilitators to help generate audience participation and interaction, as well as "take home ideas" that they could leave with the visitors who could take these further after the visit was over.

Crossing the language barrier: From the time that it started developing EE material, CEE has been exploring ways through which multi-lingual use of the material could be made possible. The production of the ACT NOW posters offered CEE an opportunity to experiment with one idea on how to deal with the multi language demand for our material. It was decided to try a format in which the visuals would be printed but the spaces for the text left blank. These blanks could then be filled in with text in the language of choice. Thus, in addition to the English language posters, sets of 'textless' posters were printed . Each such set was accompanied by a folder which contains the complete English text, along with instructions on how this should be keyed into the blank spaces.

This simple device made it possible for educators across the country to use the posters in the appropriate language. The manageable length of the text, and the spaces provided, ensured that the text could be easily translated and neatly fitted into the spaces—whether written in by hand, or pasted computer printouts. The success of the experiment is evident from the fact that not only have these sets been used in a number of Indian languages, but also in languages ranging from Mongolian to Sinhala.

This process of thinking, experimenting and trying out new ideas enabled the creation of an exhibition system in which the flow of concepts was worked out, basic information provided, and which offered a set of well-produced posters which could serve as the basic pegs on which to develop the rest of the exhibition. This further development depends a great deal on inputs from those planning to use the posters. They are aided in doing this through many ideas in the User's Manual. The final outcome, thus, is a combined


7
I Problem Packs
II Most goods are packaged today even if they do not need any packaging
a. Unnecessary packaging is a waste of raw materials and energy.
b. Plastic and composite materials (e.g. tetrapacks) are not usually recyclable, nor can they be easily broken down by the natural process.
c. Glass and metal are both reusable, and can be recycled.
d. Paper, jute and wood are reusable, recyclable and biodegradable.
III ACT NOW
IV • Don't buy goods which have unnecessary packaging. • Have bottled drinks rather than those that come in tetrapacks. • Returnable bottles are eco-friendly. • Carry your own shopping bag instead of asking for a plastic bag every time. • Avoid packaging waste by buying large economy packs - and save money too. • Where biodegradable refill packs are available, buy these.
8
I What a Waste
II A medium-sized city may produce 2000 tonnes of garbage in a day
a. An average household throws out approximately 1/2 kg of garbage everyday.
b. Food residues left open attract flies, rats, etc. which may spread diseases.
c. The role of ragpickers in sorting out garbage and salvaging materials for reuse or recycling is vital. They collect over 10 per cent of the garbage in a medium-sized city.
d. Household garbage is made up mainly of food residues which decay naturally, and glass, plastics, etc. which do not.
e. Garbage dumps are both an eyesore and a health hazard.
f. When batteries, chemicals, paints, etc. are thrown out they poison the environment.
g. Garbage used in landfills often contains toxic substances which poison the soil and the groundwater.
III ACT NOW

From the folder *Translating the Text*

effect of the basic framework, embellished and enriched by the users, through a process that is sometimes even more educationally valuable than the product itself. This has helped to demonstrate CEE's basic premise that exhibitions need to be much more than simply posters on the wall.

One Message, Many Media

CEE is continually looking for new avenues through which the Act Now theme can be communicated. In addition to print and exhibitions, the theme has been promoted through other media. A collaborative project with the Development and Educational Communication Unit (DECU) resulted in the production of some video shorts promoting similar messages.

The development of two cinema slides, with Act Now messages on water and electricity conservation respectively, provided the opportunity to experiment with a new medium.

From Action to Commitment

The opportunity to take the ACT NOW message to a new stage came in mid-1998 with the invitation to CEE to participate in a national exhibition to commemorate 50 years of India's Independence. The exhibition titled *Agrasar* was to be held in New Delhi. CEE's exhibit was a part of the pavilion of the Ministry of Environment and Forests. The theme was to project India's vision for the future.

CEE decided to use this opportunity to transform its ACT NOW message from one of suggestions and tips, to one of getting a commitment from the viewers/readers. In other words, how to transform the motto "You Can Make a Difference" to "I Will Make a Difference".

Thus the theme and title of the exhibition which evolved was "I Will". The attempt was to create interactive exhibits which would get visitors to take proactive decisions to take action. The key to doing this was the creation of two panels which had a list of twenty environmentally friendly actions. Visitors were invited to prioritize their personal action agenda by selecting or "voting" for three out of the listed twenty action points.

Some examples:

I will

- switch off fans and lights when not required;
- use public transport more often;
- carry a cloth bag for shopping;
- not spit, litter, or smoke in public places.

In order to create the appropriate scenario the two panels were designed to resemble voting booths. The voting itself was done by pressing a button switch. All the switches were attached to electronic counters. These were programmed to automatically add up the votes as the buttons were pressed. An adjoining panel displayed electronic counters which displayed the number of votes cast for each of the twenty listed action points.

This live display of the latest score for each action point attracted much attention and involvement. Voters were keen to know how the candidates of their choice were faring.

In addition to the voting panels, two other panels titled "Stop, Think, Act" presented interesting information on environmental issues that concern our everyday lives. There too, the information was presented in an interactive question and answer format. There were twenty questions. Each question had three possible answers which were printed on to flaps. The viewer could read the question and select an answer. He/she could immediately check to see if the answer was correct by lifting the flap with the chosen answer. Below, the sign ✓ would indicate an accurate answer while X would mean that the answer was incorrect. This element was a step ahead of the ACT NOW exhibition in which the panels

Photo: Sunil Jacob

provided the information or data rather than involving the viewers in finding out the answers.

As in the earlier cases, in this one too, the exhibition was facilitated by volunteers at each panel.

The response to the exhibition was enthusiastic. The visitors included school groups and the general public. The nature of the exhibits was also attractive to family groups, with different members competing to get the right answers, and animatedly discussing the choices offered by the voting panels.

Thus CEE has moved a step ahead in its mission to create a citizenry that is not only aware and skilled, but also motivated to take action and make personal commitments for a better environment.

For Our Environment, I WILL...

- Reuse old envelopes
- Keep vessels covered while cooking
- Use less plastic
- Use natural light
- Repair leaking taps
- Walk or cycle
- Install a flush tank which uses less water
- Service my vehicle regularly
- Write on both sides of the paper
- Throw garbage only in the dust bin.

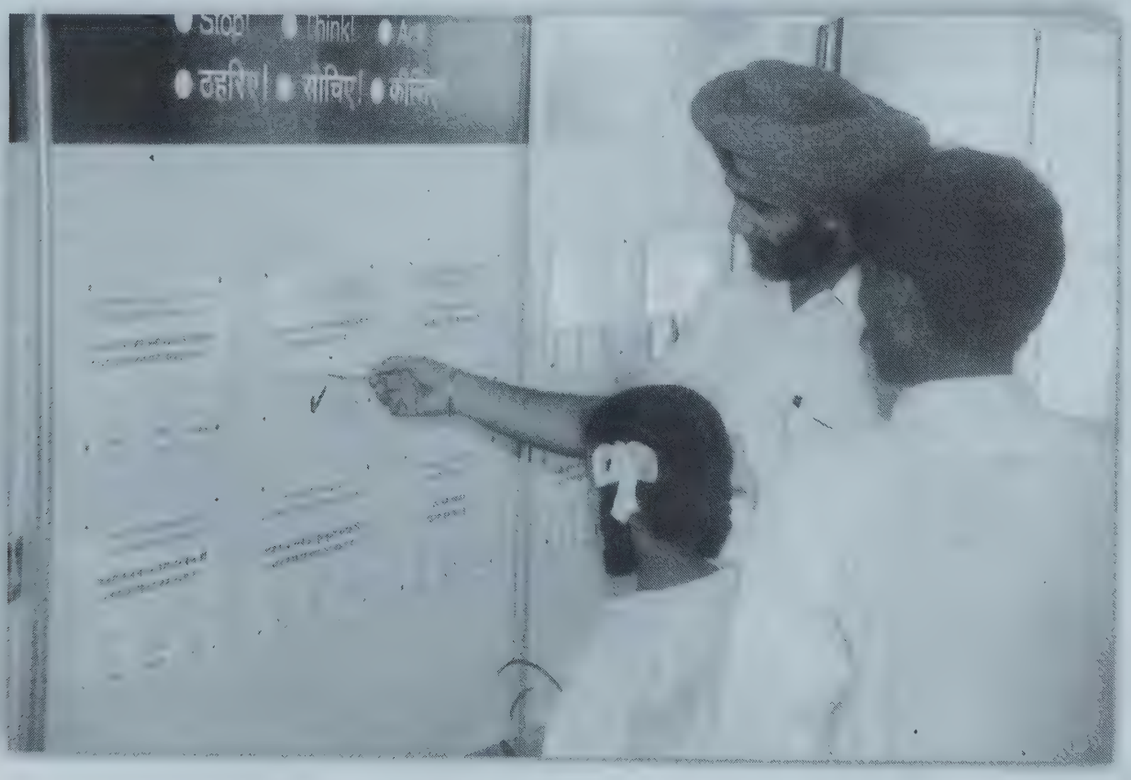
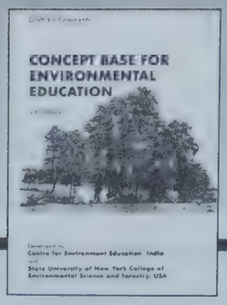


Photo: Sunil Jacob

A Base for Environmental Education



Need for *Essential Learnings in Environmental Education*

In the mid-ninteen eighties CEE was a partner in a cooperative Indo-US project which aimed to increase environmental awareness among children in India through educational television. This project, called 'The Children's Environmental Education Television' (CEETV) project, proposed to develop a series of films for children of the age group 10-14 years to create awareness about the environment. The goal of the project was to create an environmentally literate and active citizenry, by focusing primarily on children and youth.

Soon after this project was undertaken, it became clear that it was difficult to decide what each of the 13 films in this series should deal with. This difficulty arose because there seemed to be little agreement among environmental educators on what a child of that age should know, or learn, about the environment. The project team therefore felt it was important to put this down in a systematic manner. So began the exercise to lay down basic criteria of what children need to know about the environment as they go through school. In other words, an exercise to try and arrive at some framework of what could constitute the basics of 'environmental literacy'.

This immediately opened up a huge canvas. It was realized that this exercise would have to be done not by a few persons in one institution but would have to be an exercise involving a number of experts from all over the country. However a core team was necessary to compile the preliminary data and material before wider inputs and comments could be invited.

The Process: Thus, a CEE team began work on putting together a draft for comments. Based on extensive library research, it culled out short statements, each of which could constitute a 'concept' or learning objective. The attempt in this exercise was to cover the wide range of disciplines which, taken together, constitute the basic content area for environmental education.

The subjects covered a great spectrum including zoology, botany, ecology, chemistry, geography, social sciences, ethics, economics, geology etc.

As each statement was culled out and modified slightly to read as a stand-alone 'concept', the source was also noted down. The attempt in every case was to draw concepts from the most authentic sources.

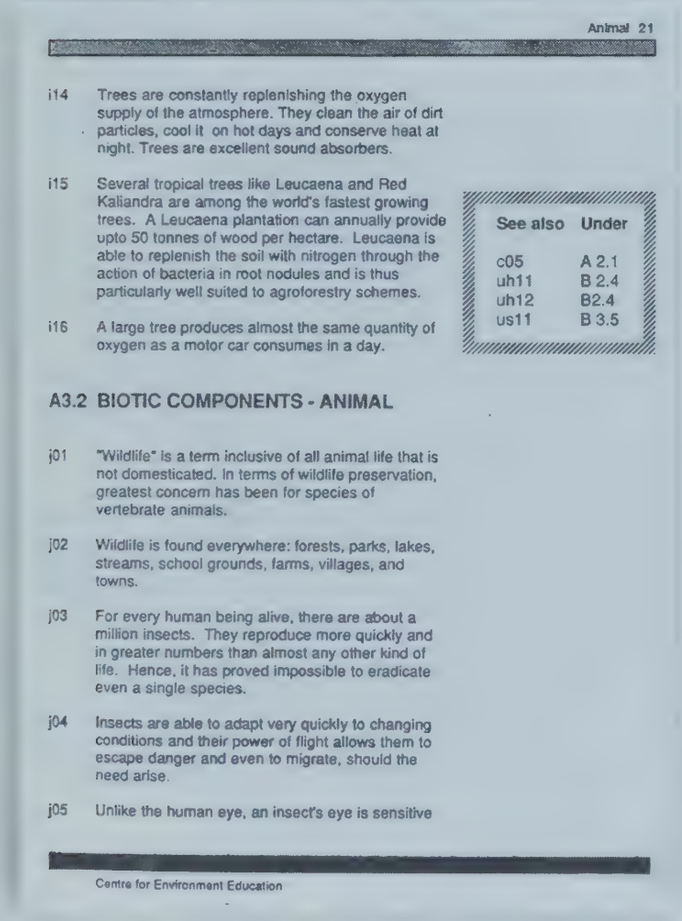
As each concept was put down, it was also reviewed and classified in terms of which level of school going children it could be most appropriately taught to. For this purpose, there were three levels of classification: Level 1: introductory; Level 2: intermediate; and Level 3: advanced; which corresponded roughly to the primary, upper primary and secondary school levels. The elementary level concepts had to be understood before the intermediate ones, which had to precede the advanced ones.

As the listing of concepts started to grow, several categories arose—e.g. living systems; man and environment; natural resources, etc. The concepts were classified and sequenced within each category. These categories were broadly put under two main sections—one dealing with the natural environment, and the other with the human environment and human impact on the natural environment.

The Teams: The Children's Environmental Education Television project under which this exercise was being undertaken was a project between Centre for Environment Education, India and the State University of New York (SUNY) at Syracuse, USA, with support from the United States Fish and Wildlife Service. Hence there were teams in both countries working on the project. The US team contributed by sending computer discs with the data in a compatible data base

format. The two sets of concepts would be combined from time to time.

The 'Zero' Draft: In about six months, the team felt that it was now ready to put out the draft for discussion. This was brought out as a publication called *Concept Base in Environmental Education: Draft for Comments*.The format of the publication was designed such as to make it convenient for people to give comments. A wide margin was left on the side where reviewers could comment extensively. At the back of the book also, a few blank pages were left for general comments. The draft was circulated widely to professionals from a wide variety of disciplines in India and the US.



Animal 21

i14 Trees are constantly replenishing the oxygen supply of the atmosphere. They clean the air of dirt particles, cool it on hot days and conserve heat at night. Trees are excellent sound absorbers.

i15 Several tropical trees like Leucaena and Red Kaliandra are among the world's fastest growing trees. A Leucaena plantation can annually provide upto 50 tonnes of wood per hectare. Leucaena is able to replenish the soil with nitrogen through the action of bacteria in root nodules and is thus particularly well suited to agroforestry schemes.

See also	Under
c05	A 2.1
uh11	B 2.4
uh12	B2.4
us11	B 3.5

i16 A large tree produces almost the same quantity of oxygen as a motor car consumes in a day.

A3.2 BIOTIC COMPONENTS - ANIMAL

j01 "Wildlife" is a term inclusive of all animal life that is not domesticated. In terms of wildlife preservation, greatest concern has been for species of vertebrate animals.

j02 Wildlife is found everywhere: forests, parks, lakes, streams, school grounds, farms, villages, and towns.

j03 For every human being alive, there are about a million insects. They reproduce more quickly and in greater numbers than almost any other kind of life. Hence, it has proved impossible to eradicate even a single species.

j04 Insects are able to adapt very quickly to changing conditions and their power of flight allows them to escape danger and even to migrate, should the need arise.

j05 Unlike the human eye, an insect's eye is sensitive

Centre for Environment Education

Page from *Concept Base for Environmental Education*

This exercise resulted in a number of critical comments on a wide range of issues: the authenticity and relevance of each statement; gaps; sequencing; the classification system; as well as the need for examples and the appropriateness of the examples given.

Reworking the Draft: Sorting through and integrating the large number of comments was not an easy task. A small team at CEE sat down and reviewed the comments received for each concept, and discussed how best the concept could be reworked. Meanwhile, the US team reworked the classification system. Each of the two teams also worked separately to review whether each of the concepts was relevant for their situation, and tried to identify what examples would be most relevant in their context. So, at the end of this exercise which took over six months, two drafts were ready: not very different from each other, but different to the extent of 10-15 per cent.

The team in India then decided that the best way to finalize the draft was to consult relevant subject experts on the specific area of their expertise. A list of experts for the various sections was drawn up and a CEE team member travelled to various parts of the country meeting them, and discussing in detail each section with the concerned expert. Wherever possible, the wording and coding of concepts were finalized then and there with each expert. However, in several cases, the experts gave their comments, but the finalization of the wording was still left to the team.

After all the concepts had been reviewed and rewritten through this process, the complete reworked text was turned over to an editorial team at CEE. This group was to check both the integration of the comments and the language editing. This editorial process was completed in a three-month period.

In the meantime, team members also worked to identify appropriate illustrations which would help in clarifying the concepts, and the CEE Graphic Design Studio worked on these.

Essential Learnings in Environmental Education

After this process the publication was finally brought out as *Essential Learnings in Environmental Education*. In this final edition, many features were added in response to the comments and reviews of the earlier drafts.

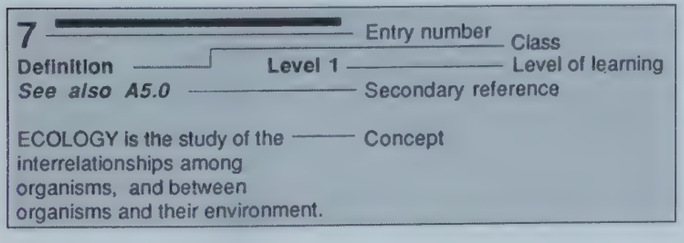
The concepts were eventually classified into three main sections: (A) Natural Systems (B) Resources

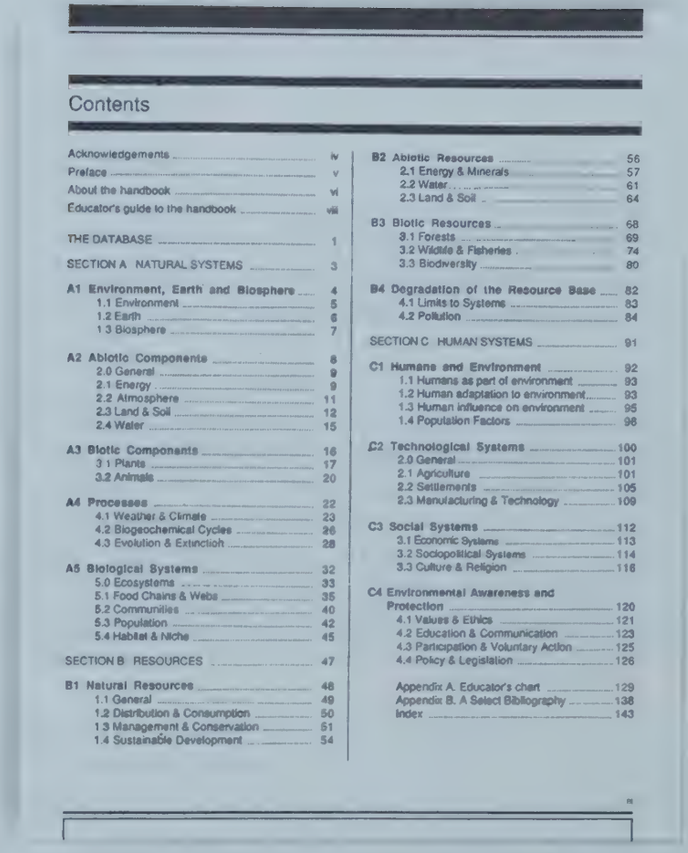
and (C) Human Systems. *Section A: Natural Systems* includes concepts related to natural (geological, biological and ecological) systems and processes. These are designed to provide basic information on natural systems as background for any environmental curriculum. *Section B: Resources* contains entries relating to human use of natural resources. These include issue-oriented concepts regarding resource distribution and consumption, as well as facts on resource use and conservation. *Section C: Human Systems* contains entries related to the social, cultural, economic and technological aspects of human interaction with the environment. These concepts deal largely with the issue of the place of humans in the environment, and the responsibilities implied thereby.

Each section contains four or five subsections and about 200 concepts. These subsections help to break the handbook into manageable sections that can be drawn upon for creating learning material.

Each statement was also coded as to whether it was a Definition, Fact, Opinion, or Issue. A *Definition* is a statement that introduces a new idea and explains it. A *Fact* is simply a piece of information about which no judgement is made. An *Opinion*, on the other hand, connotes the values of the author. An *Issue* usually indicates that there was a debate or controversy surrounding that statement.

Eventually, a total of 635 concepts were compiled. Each entry was classified and coded according to the criteria described above. These were also cross-referenced to related secondary and tertiary topics and concepts.





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The sections and sub sections of the Handbook

A note to the Educator to explain how this publication could be used; a subject-wise and level-wise index; and an extensive bibliography were included in the handbook.

Also included was an Educator's Chart which consisted of tables which listed each concept by the different classifications. The Chart could be used to find concepts that fitted a particular need; for example, if the user wants to develop an activity using only Level 1 concepts, or search for Definitions, etc. A US edition of this book was subsequently brought out.

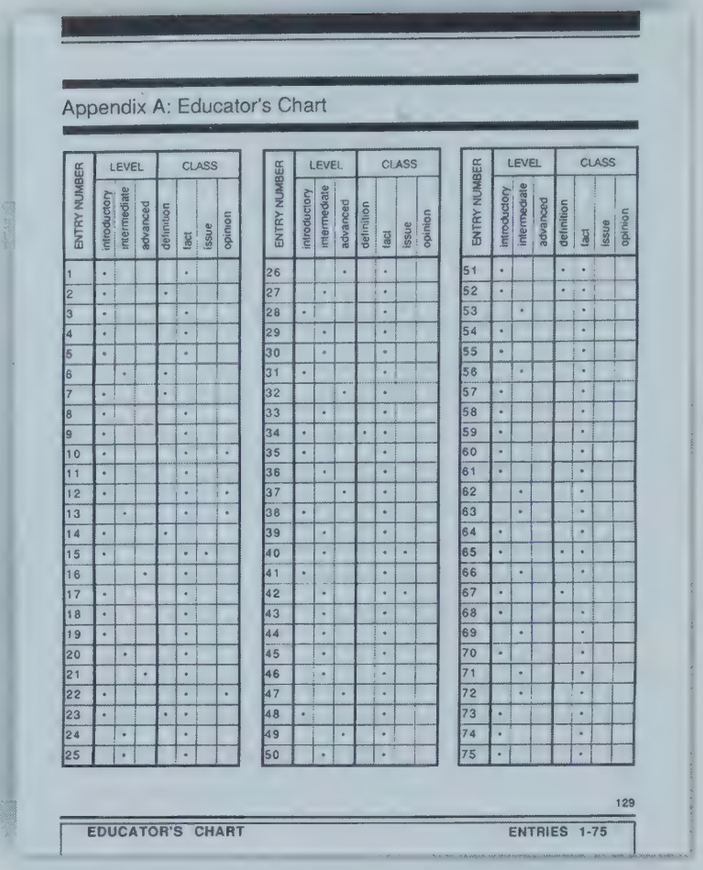
The Use: This reference book, developed through a rigorous process of consultation with a wide number of environmentalists and educators, has been a useful reference for those developing curricula, text books, lesson plans, programme outlines, etc.

It helps to define the framework and the minimum learnings with regard to a particular subject or issue. In some institutions, it is even prescribed as a text book.

Going Farther: We at CEE see *Essential Learnings in Environmental Education* as the framework for environmental literacy. If children understand most of the 635 concepts therein, they may be said to be 'environmentally literate'. However, environment, of all subjects, is by no means static. Especially, since the Rio Conference of 1992, and *Agenda 21*, many new dimensions have been added to the thinking about environment and EE.

As stated in Chapter 36 of *Agenda 21*, 'Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. It is critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistant with sustainable development and for effective public participation in decision making'.

This thinking needs to inform the listing of concepts in *Essential Learning in Environment Education*. A new revised edition which integrates concepts of sustainable development is therefore being planned.



Appendix A: Educator's Chart

ENTRY NUMBER	LEVEL			CLASS			
	introductory	intermediate	advanced	definition	fact	issue	opinion
1	•				•		
2	•			•			
3	•				•		
4	•				•		
5	•				•		
6		•		•			
7	•			•			
8	•				•		
9	•				•		
10	•				•		•
11	•				•		
12	•				•		•
13		•			•		•
14	•			•			
15	•				•	•	
16			•		•		
17	•				•		
18	•				•		
19	•				•		
20		•			•		
21			•		•		
22	•				•		•
23	•			•	•		
24		•			•		
25		•			•		

ENTRY NUMBER	LEVEL			CLASS			
	introductory	intermediate	advanced	definition	fact	issue	opinion
26			•		•		
27		•			•		
28	•				•		
29		•			•		
30		•			•		
31	•				•		
32			•		•		
33		•			•		
34	•			•	•		
35	•				•		
36		•			•		
37			•		•		
38	•				•		
39		•			•		
40		•			•	•	
41	•				•		
42		•			•	•	
43		•			•		
44		•			•		
45		•			•		
46		•			•		
47			•		•		
48	•				•		
49			•		•		
50		•			•		

ENTRY NUMBER	LEVEL			CLASS			
	introductory	intermediate	advanced	definition	fact	issue	opinion
51	•			•	•		
52	•			•	•		
53		•			•		
54	•				•		
55	•				•		
56		•			•		
57	•				•		
58	•				•		
59	•				•		
60	•				•		
61	•				•		
62		•			•		
63		•			•		
64	•				•		
65	•			•	•		
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67	•			•			
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70	•				•		
71		•			•		
72		•			•		
73	•				•		
74	•				•		
75	•				•		

129

EDUCATOR'S CHART ENTRIES 1-75

Educator's Chart from ELEE

350
Issue
Level 2
See also B1:4

The extensive use of eucalyptus trees in afforestation programmes in India has raised many issues. Their growth in low nutrient and water-poor soils to provide a dependable cash crop has met with success. Yet the depletion of soil nutrients, heavy water consumption, and failure to provide fuel and fodder have met with criticism. The monoculture of eucalyptus has also been criticized as such plantings are vulnerable to new pests or diseases, and support little other life.

Indian edition

338
Issue
Level 3
See also B1.4

The extensive use of eucalyptus trees in reforestation programs has raised many issues. Their growth in nutrient- and water-poor soils to provide a dependable cash crop has met with success. Yet their depletion of soil nutrients, heavy water consumption, and failure to provide fuel and fodder for local needs have led to criticism.

U.S. edition

Treatment of the same concept in the two editions of ELEE

Appendix 1

Developing EE Material: The Essential Steps

By the very nature of its content, environmental education is open to many instructional approaches. EE tends to be interdisciplinary, and is usually integrated within the existing school curriculum. For educators seeking new ways to integrate EE content within their subject, and for those pursuing new instructional approaches, this section offers a few suggestions.

Keeping the Tbilisi definition of environmental education (See Chapter 1) as the overall educational goal, the following steps may be followed when developing curricula, environmental activities or programmes.

1. Define goals

When designing learning activities, begin by identifying what you wish to achieve. These educational goals may be based on: a) curriculum requirements; b) class-specific goals; or c) the broad educational goals derived from the Tbilisi definition. Goals are important for educators, as well as for learners, because they indicate direction and suggest a focal point in the instruction.

2. Determine broad objectives

Environmental education is a process that takes students from a foundation of knowledge and awareness of the environment to, ideally, changed attitudes and participation in environmental problem-solving. Once you have identified what to teach, determine what type of learning is required—developing awareness, acquiring knowledge, changing attitudes or actively participating.

3. Match level of learning

Determine this, based on your needs, your audience, and their present knowledge. For example, your audience could be primary and middle-school students. An elementary level class that has previously done environmental activities may be ready for intermediate or advanced entries. However, your broad objectives can still be the same for all levels.

4. Set specific objectives

After deciding on the level, answer the question: "What specific behaviour or attitude change am I looking for?" This will describe the students' expected performance against your specific objectives. Writing detailed yet simple and small-in-scope objectives is important in designing and measuring the success of an activity or programme. The following outline may be helpful in arriving at your objectives:

Given (describe the form and content of the instructional setting)

Students will be able to (describe what students are to do) with (describe the standards for performance to be used for satisfactory demonstration of the skill).

Sample Objectives

a) Given classroom instruction and a few items of daily use (such as a pencil, ruler, eraser, paper, or anything else the students may have), students will be able to list the environmental sources of these items (for example, pencil, eraser and paper are obtained from forests), with the class being able to discuss how some of these items are obtained (for example, tree felling).

b) Given a line-drawing of a pristine environment, students will be able to sketch how the environment would change as people moved in and settled that area, with each student being able to explain what has occured in their environment.

5. Design the instructional component

The final step is organizing the instruction so that students can reach the planned objectives. A variety of activities and evaluations can be designed.

As noted above, educational objectives are of several types, falling in different places on the environmental education continuum of knowledge–awareness–attitude–participation. The teaching and evaluation of knowledge or awareness may be accomplished by traditional teaching methods. Attitude and participation may require a less direct approach. Classroom discussion is one of the primary methods of highlighting issues and instilling attitudes.

Participation is best taught by encouraging student participation in school or community environmental activities. This may be as simple as a child asking a parent to repair a leaking water tap, or taking part in a neighbourhood recycling drive. A class project is one of the best ways to practice participation concepts.

6. Evaluation

Evaluation of learning experiences based on awareness, attitude and participation is less straightforward than the cognitive recall measured by standard exams. Try evaluating the attitude entries by comparing students' environmental attitudes before and after your programme, either by using an attitude survey or by classroom discussion. Participation can be evaluated by observing the degree of students' involvement before and after the activity.

Source: *Essential Learnings in Environmental Education*

Appendix 2

Developing a Publication: A Checklist

At various stages of developing any educational publication—whether a brochure, poster, manual, etc.—it is important for the team developing it to keep asking questions to ensure that the publication is on track and will meet its educational objectives. While each team will need to develop its own checklist depending on the particular project on hand, a stagewise checklist for the development of a poster is given below as a sample.

Questions to be asked at project initiation:

1. What is the educational objective sought to be achieved?
2. How is the use of the poster visualized?
3. What is the target group?
4. Is a poster the best medium for conveying this message to this target group?
5. Is it a cost-effective method?
6. How many copies are to be printed and how will they be distributed?

Questions to be asked during research:

1. Has there been sufficient research for the team to understand the various facets of the issues?
2. Are the sources of data dependable?

Questions to be asked during development:

1. Are the messages appropriate for the age group?
2. Are there too many messages?
3. Is the text appropriate and interesting?
4. Are the slogans catchy?
5. Is there too much text?
6. Has the text been checked by experts?
7. Has the text been tested with a sample of the target audience?

Questions to be asked during design and illustration:

1. Are the visuals appropriate, correct and attractive?
2. Is the placement of text such that there is no confusion?
3. Are the type sizes large enough and graded according to importance of information?
4. Has the dummy been tested with sample audience?

Appendix 3

Some CEE Publications

Manuals

Joy of Learning 1: A handbook of 75 activities to help children understand different facets of the environment, developed for the National Council for Educational Research and Training (NCERT). Each activity is presented in a user-friendly format with suggestions as to the subjects in which the activity can be introduced; variations/ extensions; ideas for evaluation, etc. Useful for teachers of standards 3 to 5.

Joy of Learning 2: A handbook of 52 environmental education activities which teachers of standards 6 to 8 can carry out with their students. The handbook suggests activities that can be incorporated in a range of subjects that includes science, social studies, language, etc. The emphasis is on activities that can be conducted with easily available materials.

Green Action Guide: A collection of environmental action projects that can be taken up by children. The action projects are accompanied by practical tips for educators on planning and undertaking such projects. This has been developed with support from the Ministry of Human Resources Development.

Exploring a Tree: This manual for teachers of standards 5 to 8 will help them carry out an outdoor activity-based programme with their students. The activities in the manual help teachers create awareness about how a tree is important to a variety of living things on and around it. It explains how a tree is a micro-habitat by itself, while being part of the larger environment.

The Green Club: A manual which will help teachers involved in organizing eco-club activities in schools, colleges, etc. In a question and answer format, this manual helps teachers plan and organize such clubs–from selecting students, to conducting meetings, to keeping accounts. Also has guidelines for club projects.

Information and Activity Manuals

NatureScope India: A creative educational series inspired by the popular American NatureScope series published by National Wildlife Federation of USA. NatureScope India is an adaptation of this series for use in schools in India. *Amazing Mammals* is the first of the series gives comprehensive information on the theme, and also suggests ways of effectively teaching these concepts through a range of activities. This richly illustrated manual is for teachers of standards 5 to 8.

Educational Packages

Water Package: This package, for use by teachers of standards 5 to 8, consists of 16 information cards on various aspects of water; an activity booklet which suggests 12 interesting classroom activities on the theme; a colourful classroom poster; and 2 sheets of 36 colourful labels for students. The package has been used for nationwide teacher training under the National Environmental Awareness Campaign (NEAC) of the Ministry of Environment and Forests, Government of India.

Floods and Drought Package: For use by teachers of standards 5 to 8, this package consists of: a manual which gives basic information and activities to explain concepts related to the theme; a set of 11 posters which can be used as an exhibition for schools, communities, etc; and sheets of 16 colourful school labels for students. The package has been used widely under NEAC.

Conserving our Water Resources Package: For teachers of standards 5 to 8, this package consists of: a manual of background information and activities to explain concepts underlying the theme; a colourful

classroom poster which discusses adaptations in nature to cope with difficult water situations; a game which sensitizes children to appropriate water use habits. This package has been used widely under NEAC.

Ozone School Package: The package consists of a classroom chart and a teacher's manual. One side of the chart explains, in simple terms, the ozone depletion issue, causes, effects, and management. The other side provides information on scientists who have contributed to understanding the issues, and the scientific methods for measuring ozone levels. The manual gives background information on the issue, and suggests activities which teachers can do with students. Developed for the Ozone Cell, Ministry of Environment and Forests, Government of India. Useful for teachers of classes 5 to 8.

The Green Teacher: The package includes a video demonstrating different EE approaches and a manual. The manual discusses experiences and case studies providing insights to help incorporate EE in school education. The video demonstrates some of the active approaches to teaching and learning about the environment. The package has been developed with support from the Ministry of Human Resource Development and will be useful for orienting pre-service and in-service teachers.

Video Packages

Drakhi: This educational programme in a video format is set in the arid Kachchh district of Gujarat and discusses the issue of drought and its consequences, the repercussions of planting exotic plant species, and suggests what children can do in such a situation. The video has been directed by leading film maker Sai Paranjpye. Primarily made for children in the age group 10-14, this one-hour long video will be of interest to all audiences. An accompanying booklet on classroom activities enhances the educational value of the video.

For Educators and Curriculum Developers

Essential Learnings in Environmental Education: A database of 635 statements provides the framework of what constitutes environmental literacy. Useful for educators, those involved in developing environmental education programmes and materials, developing curricula, textbooks, etc. Developed as part of an Indo-US collaborative project. An American edition of this book has also been published in the US.

Exhibition Packages

Act Now Package: This set of colour posters, aimed at an urban audience discusses what a city gives us, the environmental impacts of excessive use of electricity, water, etc., and most importantly, what each individual can do to improve the environment. The accompanying booklet in English is a guide to using the posters as a framework to set up a full-fledged exhibition which may include other models, exhibits, etc., as well as ideas to make the exhibition more effective. A textless version of the posters is also available. Local language versions can be created by writing text in the desired language in the spaces provided in the posters from an accompanying pamphlet that provides text in English.

Display Material for Schools

Insect Chart: An interesting chart which illustrates the basic characteristics of insects, their life cycle, etc.

Snake Folder: This black-and-white folder opens out to form a small poster showing the four venomous snakes of India. The reverse side gives interesting information about snakes.

Birds of Indian Wetlands: An informative folder with colourful illustrations of wetland birds on one side, and information about the habits of wetland birds on the other.

For Young Environmentalists, School Libraries, Eco-clubs

Where's Away?: The book uses a story format involving two creatures, Worryworm and Litterbug, to explore what happens to the garbage we throw out. Colourfully illustrated, the book also has information, games,

activities, etc. Suitable for children in the 10-14 age group. Developed for the South Asia Co-operative Environmental Programme (SACEP) for distribution to the various countries in the region.

ABC Naturally: Using verses, the book stresses the importance of various natural resources in a simple way, and also discusses the impact of human activities on these resources. The book has been illustrated by child artists, and also suggests various activities. For the 9-13 age group, the book has been developed for SACEP for distribution to the various countries in the region.

Forest Tales: Using folk tales from the South Asian region, the book highlights environmental ethics, specially in relation to forests and forest dwellers. Colourfully illustrated, the book is suitable for children in the ages 8 to 12 years. Developed for SACEP for distribution to the various countries in the region.

Puzzling out Pollution: A book which combines information, stories, puzzles, games and activities to make children aware of the various dimensions of the pollution problem. Colourfully illustrated, the book is suitable for children in the 9 to 13 age group. Developed for SACEP for distribution to countries in the region.

Oceans Omnibus: A package on the oceans, commissioned by the Vasant J. Sheth Memorial Trust, Bombay. The package consists of a book and four posters on the subject. The richly illustrated colourful book provides general information, specific facts, maps, etc, on the different dimensions of the subject with special reference to the seas around India. The range of subjects covered includes coral reefs, mangroves, threats to oceans, oceanography, careers related to the oceans, etc. Accompanied by 4 handy charts which discuss one theme each—Our coastal heritage; Threats to our oceans; Fauna of our oceans; and Shells. This package is ideal for age 12 years upwards, and for all those who want to know about the seas.

Storm Over Silent Valley: This is the story of the battle to save one of the last remaining pockets of pristine forest in Kerala. Written by well-known environmentalist Darryl D'Monte, the colour plates and illustrations in the book bring alive the unique beauty of the forest. The book is suitable for youth, and for all those who would like to know more about this landmark case.

Pakshi Nirikshan Pustika: This book has been developed to guide children in the systematic observation of birds. Designed in a workbook format, the book consists of worksheets to be filled in by children through field observations. Basic information and clear illustrations help children to learn about 45 common birds.

Standhari Parichay Pustika: This book has been developed to introduce children to a systematic understanding of mammals. Designed in a workbook format, the basic information and clear illustrations make the book interesting and informative. The guided observation sheets in the book encourage a closer observation of mammals around us.

I Am A Tree: A touching poem of how much a tree gives, and how little humans care. Simple verses and imaginative illustrations combine to make it appealing reading for young and old. Also suitable for dramatization.

NatureFile: This series consists of publications each dealing with a single theme. Written in a style and format which will interest readers in the age group 8 to 13 years, the issues are generously illustrated and combine information with activities, puzzles, games, etc. In this series:

Ant: Eight pages devoted solely to information and facts about ants, and activity ideas to learn more about them.

Grass: Grasses, their importance in our lives and to the environment, forms the theme of this issue.

Ozone: The issue of ozone depletion and the science underlying it, the causes, the effects and the solutions are discussed.

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